INTERNATIONAL MONTHLY MAGAZINE BY AND FOR ACTIVE RADIOAMATEURS

Radiosporting

MARCH/APRIL 1987 No. 25 8702 $2.00

QUAD THAT MELTED
IN BOTSWANA

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THE IC-735 HF TRANSCEIVER

BUY YOUR HF FOR PERFORMANCE, NOT BY THE POUND

- **All HF Band Transceiver/**
- **General Coverage Receiver**
- **HM-12 Scanning Mic Included**
- **12 Memories/Frequency and Mode**
- **105dB Dynamic Range**
- **All Modes Built-In USB, LSB, AM, FM, CW**

The IC-735 is a heavyweight when you compare features and performance. Other transceivers may weigh more than the advanced IC-735 compact HF transceiver, but inch-for-inch and pound-for-pound, the IC-735 outweighs them all.

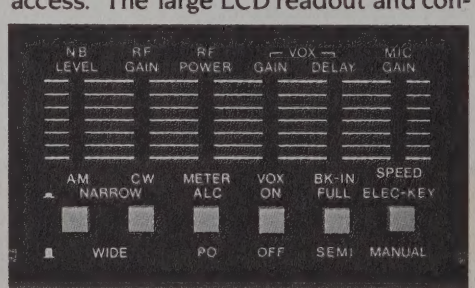
Ultra Compact. Measures only 3.7 inches high by 9.5 inches wide by 9 inches deep and weighs only 11.1 pounds. Without question, the IC-735 is the best HF transceiver for mobile, marine or base station amateur operation.

All Amateur Band Coverage. It's a high performer on all the ham bands, plus it includes general coverage reception from 100kHz to 30MHz. May be easily modified for MARS operation.

12 Memories. Frequency and MODE may be easily stored and retrieved in the 12 tunable memories.

Exceptional Receiver. To enhance receiver performance, the IC-735 has a built-in receiver attenuator, preamp, and noise blanker. PLUS it has a 105dB dynamic range and a technologically advanced low-noise phase locked loop for extremely quiet rock-solid reception.

Simplified Front Panel. Controls which require infrequent adjustment are placed behind a unique hatch cover on the front panel of the radio. The hatch cover is designed to protect seldom used controls from being accidentally knocked off line, but also provides easy access. The large LCD readout and conveniently located controls enable easy operation, especially important for the mobile environment.



More Features. FM built-in, HM-12 scanning mic, program scan, mode scan and memory scan. Switchable AGC, automatic SSB selection by band and RF speech processor. Continuously adjustable output power up to 100 watts, 12V operation, 100% duty cycle and deep tunable notch filter.

Options. A new line of accessories are available, including the AH-2 mobile antenna system, AT-150 whisper quiet automatic bandswitching antenna tuner for base station operation and the PS-55 power supply. The IC-735 is also compatible with most of ICOM's existing line of HF accessories.

See the IC-735 performance heavyweight at your local authorized ICOM dealer.

ICOM

First in

ICOM America, Inc., 2380-116th Ave NE, Bellevue, WA 98004 / 3150 Premier Drive, Suite 126, Irving, TX 75063
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All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 7351086

ICOM IC-761
A NEW ERA DAWNS

- **Built-in AC Power Supply**
- **Built-in Automatic Antenna Tuner**
- **SSB, CW, FM, AM, RTTY**
- **Direct Keyboard Entry**
- **160-10m/General Coverage Receiver**
- **Passband Tuning plus IF Shift**
- **QSK up to 60 WPM**

The IC-761 ushers in an exciting new era of amateur radio communications; an era filled with all the DX'ing, contesting, and multi-mode operating pleasures of a fresh new sunspot cycle. The innovative IC-761 includes all of today's most desired features in a single full-size cabinet. This is ham radio at its absolute best!

Work the World. The IC-761 gives you the competitive edge with standard features including a built-in AC power supply, automatic antenna tuner, 32 fully tunable memories, self-referencing SWR bridge, continuously variable RF output power to 100 watts in most modes, plus much, much more!

Superb Design, Uncompromised Quality. A 105dB dynamic range receiver features high RF sensitivity and steep skirted IF selectivity that cuts QRM like a knife. A 100% duty cycle transmitter includes a large heatsink and internal blower. The IC-761 transceiver is backed with a full one-year warranty and ICOM's dedicated customer service with four regional factory service centers. Your operating enjoyment is guaranteed!

All Bands, All Modes Included. Operates all HF bands, plus it includes general coverage reception from 100kHz to 30MHz. A top SSB, CW, FM, AM, and RTTY performer!

Passband Tuning and IF Shift plus tunable IF notch provide maximum operating flexibility on SSB, CW, and RTTY modes. Additional features include multiple front panel filter selection, RF speech processor, dual width and adjustable-level noise blanker, panel selectable low-noise RF preamp, programmable scanning, and all-mode squelch. The IC-761 is today's most advanced and elaborate transceiver!

Direct Frequency Entry Via Front Keyboard or enjoy the velvet-smooth tuning knob with its professional feel and rubberized grip.

Special CW Attractions include a built-in electronic keyer, semi or full break-in operation rated up to 60 WPM, CW narrow filters and adjustable sidetone.

Automatic Antenna Tuner covers 160-10 meters, matches 16-150 ohms and uses high speed circuits to follow rapid band shifts.

Complementing Accessories include the CI-V computer interface adapter, SM-10 graphic equalized mic, and an EX-310 voice synthesizer.

You're The Winner with the new era IC-761. See the biggest and best HF at your local ICOM dealer.

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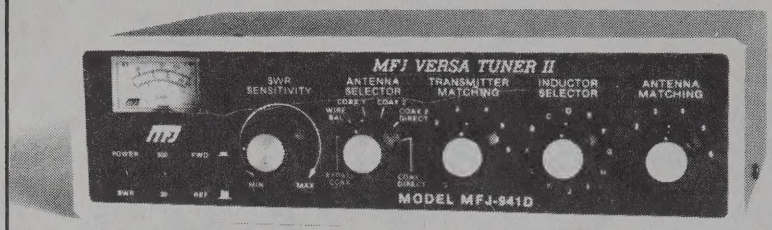
MFJ ACCESSORIES

300 WATT ANTENNA TUNER HAS SWR/WATTMETER, ANTENNA SWITCH, BALUN. MATCHES VIRTUALLY EVERYTHING FROM 1.8 TO 30 MHz.



$99.95 MFJ-941D

NEW FEATURES

MFJ's fastest selling tuner packs in plenty of new features!

- **New Styling!** Brushed aluminum front. All metal cabinet.
- **New SWR/Wattmeter!** More accurate. Switch selectable 300/30 watt ranges. Read forward/reflected power.
- **New Antenna Switch!** Front panel mounted. Select 2 coax lines, direct or through tuner, random wire/balanced line or tuner bypass for dummy load.
- **New airwound inductor!** Larger more efficient 12 position airwound inductor gives lower losses and more watts out. Run up to 300 watts RF power output. Matches everything from 1.8 to 30 MHz: dipoles, inverted vee, random wires, verticals, mobile whips, beams, balanced and coax lines. Built-in 4:1 balun for balanced lines. 1000V capacitor spacing. Black. 11x3x7 inches. Works with all solid state or tube rigs. Easy to use, anywhere.

RTTY/ASCII/CW COMPUTER INTERFACE

MFJ-1224 **$99.95**

Free MFJ RTTY/ASCII/CW software on tape and cable for VIC-20 or C-64. Send and receive computerized RTTY/ASCII/CW with nearly any personal computer (VIC-20, Apple, TRS-80C, Atari, TI-99, Commodore 64, etc.). Use Kantronics or most other RTTY/CW software. Copies both mark and space, any shift (including 170, 425, 850 Hz) and any speed (5-100 WPM RTTY/CW, 300 baud ASCII). Sharp 8 pole active filter for CW and 170 Hz shift. Sends 170, 850 Hz shift. Normal/reverse switch eliminates retuning. Automatic noise limiter. Kantronics compatible socket plus exclusive general purpose socket. 8x1¼x6 in. 12-15 VDC or 110 VAC with adapter, MFJ-1312, $9.95.

RX NOISE BRIDGE

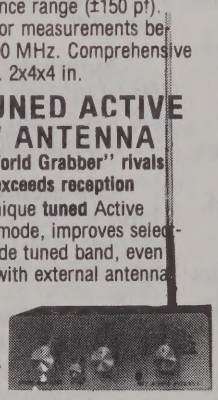
Maximize your antenna performance! **$59.95** MFJ-202B

Tells whether to shorten or lengthen antenna for minimum SWR. Measure resonant frequency, radiation resistance and reactance.

New Features: individually calibrated resistance scale, expanded capacitance range (±150 pf). Built-in range extender for measurements beyond scale readings. 1-100 MHz. Comprehensive manual. Use 9 V battery. 2x4x4 in.

INDOOR TUNED ACTIVE ANTENNA

NEW! IMPROVED! with higher gain **"World Grabber" rivals or exceeds reception of outside long wires!** Unique **tuned** Active Antenna minimizes intermode, improves selectivity, reduces noise outside tuned band, even functions as preselector with external antenna. Covers 0.3 - 30 MHz. Telescoping antenna. Tune, Band, Gain, On-off bypass controls. 6x2x6 in. Uses 9V battery, 9-18 VDC or 110 VAC with adapter, MFJ-1312, $9.95. **MFJ-1020A $79.95**



POLICE/FIRE/WEATHER 2 M HANDHELD CONVERTER

Turn your synthesized scanning 2 meter handheld into a hot Police/Fire/Weather band scanner! **$39.95** MFJ-313

144-148 MHz handhelds receive Police/Fire on 154-158 MHz with direct frequency readout. Hear NOAA maritime coastal plus more on 160-164 MHz. Converter mounts between handheld and rubber ducky. Feedthru allows simultaneous scanning of both 2 meters and Police/Fire bands. No missed calls. Crystal controlled. Bypass/Off switch allows transmitting (up to 5 watts). Use AAA battery. 2¼x1½x1½ in. BNC connectors.

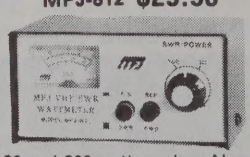
MFJ/BENCHER KEYER COMBO

MFJ-422 **$129.95**

The best of all CW worlds- a deluxe MFJ Keyer in a compact configuration that fits right on the Bencher iambic paddle! MFJ Keyer - small in size, big in features. Curtis 8044-B IC, adjustable weight and tone, front panel volume and speed controls (8-50 WPM). Built-in dot-dash memories. Speaker, sidetone, and push button selection of semi-automatic/tune or automatic modes. Solid state keying. Bencher paddle is fully adjustable; heavy steel base with non-skid feet. Uses 9 V battery or 110 VAC with optional adapter, MFJ-1305, $9.95.

VHF SWR/WATTMETER

MFJ-812 **$29.95**



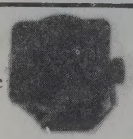
Low cost VHF SWR/Wattmeter! Read SWR (14 to 170 MHz) and forward/reflected power at 2 meters. Has 30 and 300 watts scales. Also read relative field strength. 4x2x3 in.

1 KW DUMMY LOAD

MFJ-250 **$39.95**

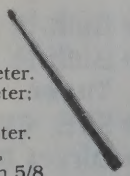
Tune up fast, extend life of finals, reduce QRM! Rated 1KW CW or 2KW PEP for 10 minutes. Half rating for 20 minutes, continuous at 200 W CW, 400 W PEP. VSWR under 1.2 to 30 MHz, 1.5:to 300 MHz. Oil contains no PCB. 50 ohm non-inductive resistor. Safety vent. Carrying handle. 7½x6¾ in.

Compact Speaker



MFJ-280, $18.95. Mobile speaker. Tilt bracket on magnetic base. 3½ mm phone plug. Use with 8 & 4 ohm impedances. Handles 3 watts audio.

Handheld Telescoping Antennas with BNC



MFJ-1710, $9.95, 3/8 wave 2 Meter.
MFJ-1712, $14.95, ¼ wave 2 Meter; 5/8 wave 440 MHz.
MFJ-1714, $16.95, ½ wave 2 Meter. End-fed halfwave dipole. Shorter, lighter, more gain, less stress than 5/8 wave on handheld.

DUAL TUNABLE SSB/CW/RTTY FILTER

MFJ-752B **$99.95**

Dual filters give unmatched performance! The primary filter lets you peak, notch, low pass or high pass with extra steep skirts. Auxiliary filter gives 70 db notch, 40 Hz peak. Both filters tune from 300 to 3000 Hz with variable bandwidth from 40 Hz to nearly flat. Constant output as bandwidth is varied; linear frequency control. Switchable noise limiter for impulse noise. Simulated stereo sound for CW lets ears and mind reject QRM. Inputs for 2 rigs. Plugs into phone jack. Two watts for speaker. Off bypasses filter. 9-18 VDC or 110 VAC with optional adapter, MFJ-1312, $9.95.

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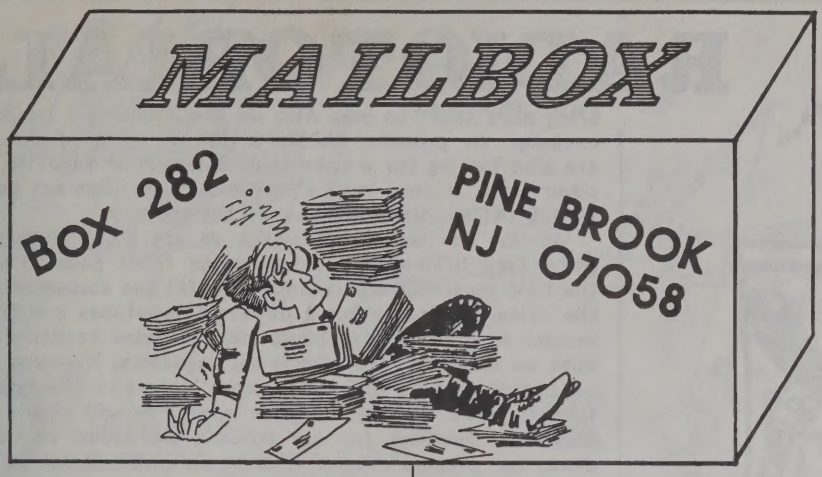


ND6U:

Just a little note saying how much I enjoy your magazine. To me, it is the best one around for 80 and 160 meters. A person gets most information from antennas to operating. Maybe you can figure out how to work 80 meters without loosing so much sleep (I get up at 5 a.m. to go to work). Great scoop!

Tim Pirkl, ND6U

AA4NC:

I read with amusement the letter from John Marshall (Florida Skip) in the February '87 RADIOSPORTING, doubting the possibility of a 240 contacts per hour rate in the first hour of a contest. Any serious contester knows that rate is not impossible, but quite achievable, depending upon band conditions, operator skill, location, type of contest, etc.

In this year's ARRL DX Contest for example, myself, AA4GA and WB6SHD operated VP2MU multi-single. During this contest, we had eight hours of rate over 240 QSOs/hour on 15 and 20 m. During the high sunspot periods of 1981 - 1982 from VP2E, we had hours of 350+ QSOs/hour. I don't know what the record is, but I suspect that JA3ODCs 400+ QSOs/hour from VP2KC in the 1979 CQ WW comes very close.

I suggest that John try listening to a serious contest station in the next DX contest, and verify himself that these rates are not that fast at all!

Will Roberts, AA4NC

K08M:

Enclosed is my check for renewal of subscription to RADIOSPORTING, a great magazine. I subscribe to HR, QST and the W5YI Report, but consider yours the best. Keep up the good work. It is appreciated by all.

Several of my friends and myself thought that your cover picture of the April 1986 issue was great. (Beautify your neighborhood.) That sort of picture might be offensive to antenna manufacturers, but if a picture is worth a thousand words, then let them build stronger antennas. I've lost my share of antennas to ice storms over the years, and know what it's all about.

I don't think that I totally agree with your views on computers. Having used both the IBM XT, and the Commodore 64. Most of the IBM clones may operate faster than XT, and that is plus, but 95% of the hams I know have to consider budget first, and with the proper programming the 64 is very capable. Also there are several times more 64's in ham shacks than any other make (ref. QST). Let's see some articles on the 64. See you in Dayton!

Larry Townsend, K08M

Dear Larry,

Thanks for your kind comments. Just for that, we have another picture from series "beautify your neighborhood" on our April cover this year. The last year's quad casualty was a home brewed one, so no manufacturer should be upset.

95% of hams probably don't need IBM clone. Those 5% contesters on the top of the scores do need it, C64 just will not hack it, slow disk, not enough memory. IBM clone can be assembled for about $500 including disk drive and hi-res monitor. That is almost what people paid for a C64 system, but PC has about ten times more memory, decent drives and excellent monitor. Commodore is still good around the shack, for packet, etc. de VE3BMV

K7FD:

Another issue of RADIOSPORTING arrived this week and I must say it gets read cover-to-cover. I don't even operate 160 , but I enjoy reading about the success of others.

My own situation may help others. My neighborhood allows NO ANTENNAS period. To get around the rules, I slipped a Hy Gain 14AVQ vertical inside a 19 foot, 2 inch diameter PVC pipe. I installed 30 radials while "gardening" and then raised my new white flagpole, complete with old glory. My neighbors know nothing, and I just logged my 118th country with this system.

I agree with you on "lists" and ON4UN on "CW." CW is a real pleasure since 6 days a week you'll find me announcing at KYQT-FM!

Jon Nicholson, K7FD

VE7BS:

I don't know who holds the patent for the Beverage antenna (probably RCA), but I think it was described by Kellogg and Rice (and Crispy? Hi. Sorry, couldn't help it. 3BMV) before Harold Beverage built one, and the first working terminated ones were organized by all three working together.

Probably the first one used in amateur service was Paul Godlet's at Ardrossan in 1921, for the Transatlantic tests on 230 meters. Of course in those days it was called the Wave Antenna.

Calling for a vote on the use of the WARC bands for contests without first discussing the pros and cons is like calling for a vote on reduction of taxes without first telling what services would be cut as a result.

10 MHz cannot be lumped together with 18 and 24 as "WARC bands." 18 and 24 will be amateur bands by 1989. On 10 we are secondary to the Fixed Service. If misuse 10 we may lose it. The only thing against 18 and 24 being included in the DXCA award is that many countries have not yet authorized amateur use, making it unfair to some. But what else is new? All awards are unfair to some.

Bob Eldridge, VE7BS

Dear Bob,

We are not proposing to run contests on 10 MHz, just count or recognize the countries as people work them obeying the rules, as we do it now. If there are fixed services, let the frequencies be known, and we will avoid them. 160 m band was not authorized in all countries and we chased and counted DX contacts. This will put more pressure on the officials to allow their countrymen usage of the bands, as did the work of our 160 m pioneers. Now we can finally work all zones on 160. Even the "latecomers" can have a ball, see ON4UN report.

73, de Yuri

WB9TBU:

I feel very strongly that we should keep the 10 MHz band for the DXCA award. I spend a lot of time on that band. While I don't want to see contesting there, I see no reason to not use 10 MHz QSOs for award credit. Certificate chasing competition cannot be compared in the same breath as contesting competition, they are totally different. 10 MHz contacts are not hit and run QSOs. It is the nature of the 10 MHz operator to sit back and chew the rag. When DX shows up on the band there are no pileups, not even when a C3 station showed up a couple of months ago. So, my vote is to keep it.

Paula Franke, WB9TBU

JH1KRC:

I am very pleased to write to you for the first time. My friend Shige, JH1GTV let me read your magazine and I found it very interesting, not merely so, but also it is what I have been looking for in ham radio publication. I would like to subscribe to ALL issues of RADIOSPORTING from the issue No.1 and at least for another year.

I am not an avid contester, but I do enjoy contesting as well as DXing, awards, technical aspects of antennas and equipment design. Now in JA, it's sorry to say, avid amateurs who like experimenting and technical work have become the "drop-outs" from the majority of JA hams, some 500,000. Only some fifty or hundred "experts," true amateurs survived. Still we can find many avid and devoted amateurs in USA and Canada like you. I like subscribing and reading a lot of English language publications. Congratulations on your great job with IRSA and RADIOSPORTING!!!

Mike Watanabe, JH1KRC

KG6DX:

This year's CQ WW I tried 80 m SSB and CW. I found out when you are 5000 miles away from Europe and USA it's hard to run up much of a QSO total with a small antenna. I did hear lots of stations, but that doesn't count.Hi Multipliers are very hard to come by.

I may make it to Dayton this year if I can find a hotel room. Keep up the good work with the magazine, I read it cover to cover!

Joel Chalmers, KG6DX

W8LKH:

Thanks for a F.B. magazine. Like the way you "tell it like it is." Keep up good work! All the best!

Dick Hatton, W8LKH (since 1934)

KD5M:

Thanks for the back issues. They have been most enjoyable and fascinating reading. Please keep up the outstanding job you are doing. RADIOSPORTING is what I've looked for for a very long time!

Edward Seeliger, KD5M

VE3BMV/W2

RADIOTORIAL

Welcome to our 25th issue anniversary. Our radio baby is still alive and kicking. It is kicking harder and starting to stand on its feet. Another goal - getting into the black- was reached and XYL has no more argument for "quitting this thing." If our trend of gaining subscribers continues at this pace, very soon we will see the laser printer working here and putting out some gorgeous looking pages. The type will be black and sharp. The page makeup software and laser printers are getting better and we are getting closer to getting one.

We had another small break in our regular delivery of RADIOSPORTING "skipping" the March issue and combining it with April. We are extending everybody's subscription by one issue. Please check your label. Hopefully this will bring us back on schedule and from now on we should be a regular, monthly magazine. If all goes well, our schedule looks like this: material for the issue should be received around the fifth of the month, the issue is finalized and goes to the printer on 10th (camera ready advertising would still make the deadline). Back from the printer on 13th and gone in the mail within the next day or two. In US and Canada you should receive it anywhere from 5 to 15 days, before the month marked on the cover is over. For overseas, printed matter surface mail it takes another two to three weeks. We found out that our February issue was really delayed in US and Canada. While ON4UN received his air mail copy within four days, many US and Canadian hams had to wait about a month. Issues for Canada went first class. Go and complain to your post office. Talking to knowledgeable people, I found out that usually, the post office delivering the mail to you, is the one who delays it.

We are changing our subscription rates for DX and Canada to accommodate the difference in the cost of mailing from US. Please note the changes on the last page and the renewal form. Also, First Class delivery is now available in US for an additional $8 per year. The air mail rate for overseas is additional $15 per year.

Finally, we had a chance to send out the renewal notices to those who have "expired" and those who are due in the next three months. Please renew on time and avoid an interruption of your favorite magazine. We will continue mailing the renewals from now on.

We sent out letters to advertisers encouraging them to support your favorite magazine and to help them to sell their wares to you, the most active segment of our radio population. You can tell the good "corporate radio citizen" by the size of their ads in RADIOSPORTING. If you don't see them, don't hesitate to mention it to them. If you see their ads in RADIOSPORTING, please thank them next time you buy their wares. Advertising here helps them to sell the stuff, and it helps us to get better, prettier and to bring more stuff to you. Also we are mounting a publicity campaign to promote RADIOSPORTING in other media. We are also looking for a commission salesmen of magazine and advertising. If your local electronics store does not carry RADIOSPORTING, please let us know the address.

As you can see in this issue we are going through a minor face lift. We are changing our front page to make the title more readable (thanks to KN7K) and accommodating the index. We are adding a different typefaces and frame around the text. This should make it more readable and what we are used to seeing in big magazines. The type is a bit heavier and we are fitting more letters on the line, so there is more reading for your money. We will slowly refresh the headings for our columns and titles as we go along. Our present printer is doing an excellent job as far as paper and print quality goes. As we get more organized, we will be able to take advantage of this and have some really sharp looking diagrams and photos.

We are pleased to announce the addition of two more helpers to our staff - our sons Adrian and Orest, who are starting to keyboard (fancy word for typing on a computer) the material. They are taking it at school, so why not practice and do something useful too.

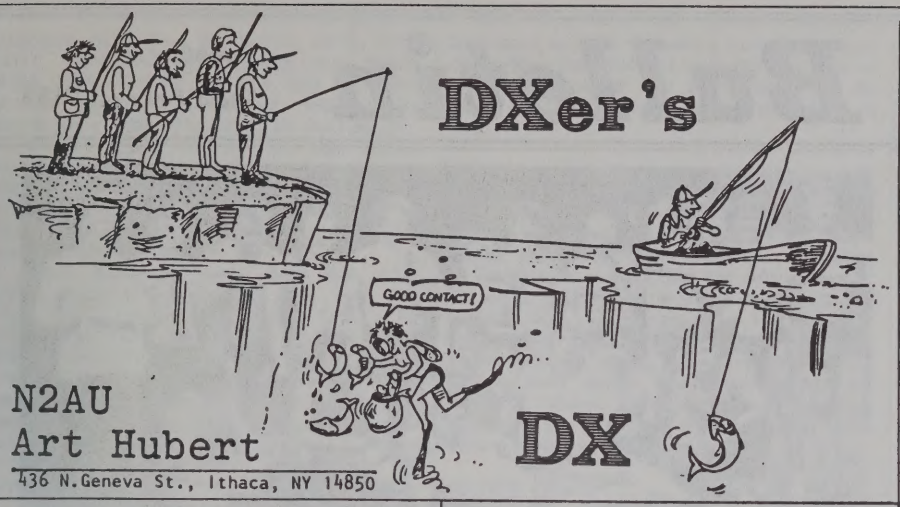
There was one small problem with last issue's mailing labels: some labels were printed with the next label's expiration date. If your label had "exp:XXXX" on the bottom, please disregard it. Check the label on this issue, this should be the current one. Those who "expired" were mailed renewal notices. Sorry about that, even computers (in the hands of humans) can goof sometime.

Finally, I had the pleasure to visit the Frankford Radio Club meeting in Philadelphia. Guess what? Half of the crowd was reading W3BGN's collection of RADIOSPORTING! Advertisers take note: for every subscriber, there are at least three readers of RADIOSPORTING! So we have more readers than we think. We hope that one look at RADIOSPORTING convinces the "borrowers" to subscribe to their own copies.

Ever wondered what keeps the Frankfort RC at the top of club competition for so long? No "organization," no dues, just a terrific ham spirit of helping one another, so they can beat each other in a contest! FRC has meetings every second tuesday of each month in Philadelphia (in the summer months, various club members host the outdoor-picnic style meetings), operates a repeater on 147.270/870 MHz and publishes an excellent bulletin, which are supported by donations. This way, even college students, the young blood, can afford to be members. Wanna join? Contact the president of FRC - Charlie, K3WW. I had the privilege to join this super bunch and hope that I can live up to the club image and contribute my contest scores very soon. FRCers are gearing up for the Packet DX alert system which should boost their multi's scores. Many are using the DVK-100 Digital Voice Keyer described first in RADIOSPORTING, which helps to save the voice on phone and keeps the frequency warm when things get slow. A super gadget!

We welcome Harry Schools, KA3B and Harry Arsenault, K1PLR to our contributing staff. KA3B will keep you informed about 6 m activity, while K1PLR will write about 10 meters. More new columns are in the works and as we climb out of the sunspot pit, we will focus more on higher bands.

I hope to be able to fire up in the CQ WPX SSB from somewhere. Things are looking better here. A two meter vertical is on the roof, an 18AVT is on the ground, so we are back to the little pistols stable. As the Spring progresses, we will start looking for a place in the country to put up the real stuff - the contest artillery. Can't wait to see how that VE3 measures up in this competitive Amerika. Keep reading and keep writing! 73 de Yuri



N2AU
Art Hubert
436 N.Geneva St., Ithaca, NY 14850

1987 started well.

1987 has been a banner year for the DXer. The 3Y operation in January - February brought out many of the old time DXers who wanted to work an all-time new one.

The VK9Y operation by W5KNE and VK9NS caused the DXer's heart to speed up, for some it was a disappointing time because of poor propagation. The VU4 operation from the Andamans has caused king-sized pileups and provided a new one for the DXer. The last DXCC valid operation from there was in the mid-seventies. The ZYØSA and ZYØSB operation from Peter and Paul Rocks created its share of excitement. The YVØ operation from Aves Island is scheduled for mid March and Libya has been active in the form of 5AØA. The JARL has promised to activate a rare one to celebrate it's 60 anniversary this year, and we still have nine more months left in this year to produce many more rare operations. I dare anyone to say that there is no rare DX to work at the bottom of a sunspot cycle.

While on the subject of pileups, some of the operating practices of DXers over the past several years in the pileups have caused total chaos. Some of the poor operating procedures you would expect from a newcomer, but there have been many seasoned DXers using less than desirable procedures. The constant calling, vying to insert your callsign last, calling on the DX station's frequency when he is listening split, policing, and the list goes on and on. I listened to one pileup on the VU4 operation several mornings ago that lasted over 20 minutes non-stop. It totally escapes my intelligence how this could happen, how can anyone expect to work DX when they do not give him a chance to answer? We all make mistakes in the pileups due to the excitement of possibility of working a new one, but we all should try to clean up our operating practices, let us all listen a little bit more. If a station asks for a certain callsign and yours does not resemble that callsign don't call, and above all listen to the DX station rules on how he is running the show.

To the station at the other end of the pileup: you should and can call the game plan. If a station causes problems - BLACK LIST him, make a few examples of those who fail to heed your operating scheme. If you have a big pileup and can operate split, do so, it will make working the pileup easier. The most important thing for you to remember is that it is your pileup and you are the boss - call the shots.

I am looking for old DX bulletins, QSL lists, old DX QSL cards, DX logs for my reference library. I will pay the postage, please advise what you have.

Hope to see you all at Dayton this year.

3Y1EE, 3Y2GV, PETER I

operation has been credited for DXCC and the QSL cards may be submitted on June 1 for DXCC credit. The operation is also valid now for the Golden Jubilee DXCC. QSL via LA6VM.

3Y, BOUVET

There is a rumor floating around that the operators from the successful Peter I operation will try to activate this one early next year. Lets hope this rumor is true.

4W1AA, NORTH YEMEN

This operation might be legitimate one, TK5FF worked this one and has received a QSL for the station with a North Yemen return address on it. The reported operator is N5GJL who is in Yemen on a work assignment. The address is Gerry Jensen, Crew 770, Box 17086, San'a, North Yemen. It has not be determined if this operation has proper documentation.

4X6TT, PACIFIC AND ASIAN TRIP

Amir will be travelling throughout the Pacific and Southeast Asia area during 1986 and 1987 starting in June for one year. He plans to operate from 3D2, A35, VK9N, VK9L, VK, ZL, ZL8, ZL9 and other islands. On his Asian trip he will visit and try to operate from: BV, VS6, V85, HS, 4S7, 9N1, XW and XZ. The last two on the list should bring out big DX crowds.

5AØA, LIBYA

The ARRL is counting this one for DXCC. Herbert is very active on 14004 at 1300z. He also has been reported on 21004 and 7004. The European DX Foundation donated a new FT-901DM to improve Herbert's signal. QSL via SP6BZ.

5X5GK, UGANDA

Gerry continues to be active on 20 m SSB, try 14145 at 1745Z and 14295 at 1930Z. He also shows on 3780 and 3794 at 0400 - 0430Z. QSL via DJ5RT.

5Z4KG. KENYA

This was Llyod and Iris's last operation on their 1986/87 African DXpedition. During this outing they operated from FR, 8Q7, S79, D68 and FH8. QSL via YASME.

7Q7LW, MALAWI

Les will be leaving Malawi for good in the beginning of May of this year, so if you need this one, better work it now. You can find him on 21285 at 1630Z and 14285 at 1900Z. He also shows on 7002 at 0400-0430Z and sometimes on 2795 at 0330Z.

BY9GA, BYØAA, PR CHINA

have been very busy keeping DXers happy by providing a Zone 23 QSOs. They can be found on 14023 and 14029 respectively most evenings. BY9GA also shows on the W7PHO net some evenings at 2330Z. QSL via CBA.

KK7K/DU2, PHILIPPINES

Lonnie has been keeping this one on the CW map, you can find him on 7007 at 1100-1230Z and 14022 @ 1300Z most mornings. He will be there for another six months. QSL via N2AU.

FR/G/FH4EC, GLORIOSO

Daniel has completed his tour on Glorioso Island and has returned to Mayotte. He was very active on 20 m SSB. QSL via F6FNU.

FR/T, TROMELIN

FR5ZU and FR5AI hope to activate Tromelin during March and April on all bands, with most of the activity centered on 15 and 20 m CW and SSB. QSL via FR5AI.

FT8WA, CROZET ISLAND

This one is quite active on 14236 @1900Z and 7090 listening on 7208 at 0345Z. QSL via F6FNU.

JW, SVALBARD

SP5EXA will be active from Svalbard again starting in June and continuing on through August.

S92LB, BANGLADESH

If you need this one, opr. Luis is active most days on 14182 @2230Z. QSL via his CBA.

P9LZ, NORTH KOREA

has been showing on 7005 @1400Z working JAs and West Coast NA stations. If this is a legitimate station, will it add a new country North Korea? The operator's name is Song and according to several JA sources his N.Korean address is valid.

PAØGAM/ST2, SUDAN

will be working in the Sudan for one and half years and should be active on all bands mostly CW. QSL to his home address.

TT8, CHAD

Tom, N4NW hopes to activate this one sometimes in late April or early May. If he is successful, QSL to his 1987 CBA only.

VK9MS, NORFOLK

Jim Smith is very active on all bands CW and SSB. Try 7003 @1130Z, 14220 @0700Z and 14002 @2230Z (long path). QSL via his CBA. Jim completed a successful DX jaunt to VK9Y with W5KNE and a solo operation from VK9X in February and March.

XU1SS, KAMPUCHEA

has been somewhat active on 7002 @1215Z. The signals have been on the weak side, not much 20 meter activity from this one lately. Rumor is that this station is on the run much of the time to prevent being overrun by Vietnamese. QSL via JA1HQG.

ZD7AF, ST.HELENA

is the latest addition to the DX ranks from the island of St. Helena. Adrian is 15 years old and is the son of ZD7BJ and ZD7XY. Look for him on 14166 at 2200z. QSL Via N2AU.

ZS8, MARION ISLAND

there is a possibility of an operation from this one sometime in late April.

Does anyone have the QSL routes for the following stations? KG4CD (82), KG4EC (70), KG4TR (86), KH4/KA4P (81), P29PC and LAØAD of the early seventies? Did anyone receive card from PYØFG? (N2AU)

160 m Bulletin

Founder - Stew Perry, W1BB

160 m DX News

Wally Stefanoff, LZ2CJ

PO Box 73, Levski, Bulgaria

The end of 1986 has brought me some changes. In October of 1986 I have entered the training program in Oral and Maxillo-facial Surgery and also changed my place of living. This additional workload and changes will limit my free time available for ham radio, but I will try to keep up with the news at least every second issue of RADIOSPORTING. I hope that situation changes soon and that I will be able to get back to our monthly contributions.

I have already send the questionnaires to some of the 160 meter DXCC holders and I really hope that this time I will get more cooperation. In the past the input from Latin American and African DXers was nil.

The Asian top ten 160 DXCC standings have changed a bit from those printed last time. New scores came from 4X4NJ, UA9CBO and UG6GAW. We will have new updated tables in the upcoming issues. If you made any improvements please report your score to me or directly to RADIOSPORTING.

LETTERS

RB5MP - Serge writes that he is very busy at the university this winter season, but he is trying to show up on the band whenever possible on CW and he hoped to be on for 160 m CQ contests. He informs that QSL cards for UV100 - Franz Josef Land station should go via PO Box 187, Omsk City, 644050 - USSR. Serge is a member of "Cuba DX Group" and contacts with him count 1 point to those interested to become members of this group.

RF6QAI - Yuri reports that he is now off the air due to his studies at Pskov Engineering University, but hopes to be on as RF6AQI/U1W. He is a chief operator of the school's club station UZ1WWJ. The equipment is all home brewed and the antennas are dipoles for all bands. They will put up some better antennas in the spring. They are active in the contests and other active stations from the area are RA1WW, UA1WDQ, UA1WEJ, UA1WT.

UA6BEB - Alex has graduated from university and now works in Taganrog and is off the air. He had to close his own station due to the lack of free time available. He has 80 countries confirmed on 160. He still operates his club station UZ6LWZ, using Inverted Vee and they hoped to have wire vertical up for the 160 m CQ contests.

USSR 160 m DXer's meeting - Kiev 86.

A number of most active USSR top band operators met on June 24 in Kiev to exchange ideas and experiences. This meeting was organized by the #1 USSR 160 m DXCC holder - Alfred, UT5AB. Discussed were such subjects as: DXing on 160, teaching the newcomers to top band, ways of making the operating on 160 more pleasure rather than a torture it is.

SH1SHK AB9B (Shish Kabob) and DX hungry 160 m USSR DX gang at KIEV 86 meeting. Back row standing L. to R.: UT5AB, UT4UB, UT5BN, RT4UA, UB5KW, UT4UY, RB5RR, UW3PN, UA9CBO, RA9AKM, UA1OT (FJL), UT4UW. Kneeling are: ?, ?, ?, UA4HBW, UA6HOF, UB5ZX, holding the sign is UB5ZAL and "horizontally polarized" is RT5UY who took the photo.

RT5UY and RT5UL showed the slides and told about their DXpeditions to UI and UJ lands made last winter season. Present were also UA1OT from FJL and his QSL manager UB5KW (see photo). UA1OT was talking about his experiences from FJL on 160. Al, UT5AB got some bad news from UG6GAW - Garlan beat him in 160 m countries count. Not bad for a youngster from Georgia!

The official meeting was followed by a pleasant party at the banks of Dnepr (Dnipro) river. They all promised to be back next year.

I04YSS Modena Contest Club Location

This is a view of not your run of a mill station. The top of the platform is at 60 m level and the diameter is 25 m. For 10, 15 and 20 m they use 3 element Delta loop antenna with top another 15 m above the platform. For 40 m they use 4 vertical switchable phased array with gain of more than 7 dB, F/B 25 dB, F/S 20 dB. The top portion of elements is made from tubing, the bottom part from the wire. For 80 m they have three sloping Delta loops. This site was also used to operate in CQ WW 160 m SSB contests last few years. (tnx I4JMY)

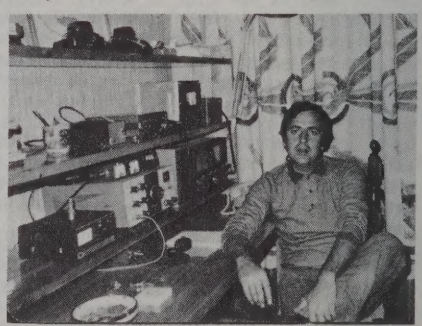
contest was done well ahead of the contest.

For the 1986 run I wasn't able to make the usual yearly check of antennas and equipment. The only thing I have done was to check the performance of the Beverages just before the contest on Friday afternoon. Quick inspection showed that all was in place, I turned on the equipment and had a QSO with Amir, 4X6TT who was at 584LP's QTH using P36P contest call. They were going to operate multi-multi category and were checking their Inverted Vee at 170 feet and 100 W transceiver. P36P signal was excellent. We tried to experiment with reducing the power level and we were amazed that we could still maintain the contact with 100 mW on both sides. Antennas were working and we made skeds for the contest. I went to bed to get some sleep.

Being quite a bit tired, I overslept first 24 minutes of the contest and jumped in "the boiling water" without even washing my face and having an ice-cold coffee in between the calls.

In spite of all this I've been lucky. Except for conditions to certain areas, Murphy stayed somewhere else. Conditions within Europe were good and working lot of Europeans helped to make decent score again.

Propagation to North America was worse than previous years. We worked only few



Chris, SV1DT is one of the Greek top band enthusiasts. Together with SV8CS, SV1LK, SV1PL and SV3QD he was among the first stations on 160 m. He has a similar problem with other SV hams: lack of space for decent 160 m antenna. Presently he is using Inverted Vee with apex at 60 feet and FT101ZD. He is usually active during the winter season and always happy to be a new country for those who still need Greece.

stations: N2AA (best NA signal), VE1ZZ, NF2L, W1FC, W4DR and VE8DX. Heard were N1ACH, K2RR, K8CFU, VE1NH (?). The only Caribbean station worked from here was VP2MU, who's signal was persistently strong all the time. We called VP2EC gang, but no luck, they seemed to pay attention to their skeds only and ignored all the European stations that were calling them. They must have missed a big chunk of multipliers. (I Guess everybody has a right to operate his way. Hi)

Usual number of UA9s, UAØs and other Asian stations were worked from here. (4X, P36P, JY7Z.) From Africa I logged EA8s, EA9s, CQ9MI, 5N2BBAV AND ZS6BRZ. ZS6BRZ and 5N2BBAV were very strong for quite a while here, but CQ9MI will need more power or better antennas to be able to get attention of more European stations. Mike, VK6HD was apparently operating single band 10 m, so we missed him and nothing else was worked from Oceania this year.

Two Turkish stations were active in the contest: Bahri, DJØUJ operated as TA2BK (all bands) and TA1KA/2 - single band 160.

If you still need Hungarians - HG6N, HG5A, HG9R, HG7B were and promised to be on in 1987 CQ WPX contest.

Here is some detailed information on SV activity: SVØAH was /SV5, J49A was in SV9, SVØAC was / SV9 and J48CS was Spiros, SV9CS.

VP2EC behaved a bit rude, when they came on my frequency and without asking, they started to run their skeds. Thing that bothers me more is a fact that I was called two times early in the afternoon by station signing 4U1VIC and OHØAM with quite good signals. They did not appear to be strong enough to indicate LZ stations, but looked like someone was using those calls to either check to see how he is getting out or get me in trouble. Such practice is against the rules of ham radio operating. We have to do our best to avoid such practices in order to preserve the integrity of contesting and operating on ham bands.

LZ2CJ claimed score is 1077 QSOs, 61 countries, 13 zones for a total of 89244 points.

IRSA WRC Contest.

Since it was a first time ever for this contest, to tell the truth, I did not expect too much from this premiere run. This was based on knowing the bureaucracy in some European Societies as far as contests are recognized. Also IRSA test was not as yet recognized by the Central Radio Club of USSR, which would reduce the participation of USSR stations by quite a bit. (This contest would not count for the national championship.)

On the other side the IRSA contest was really successful in North America as I understand. We will do more advertising on our continent for the next year and we hope to have much more participation. I operated single op - single band 160 and made 522 contacts on SSB and 114 on CW with 35/42 multipliers. My score was 36575 points on SSB and 14112 on CW.

Toivo, RA3AR (ex UA3AEL) has discovered the magic of 160 last season and became a 160 m fan. He lives in Moscow and also is limited by the available space. He is using an Inverted Vee, which is very noisy, but better than nothing. Toivo likes top band DXing, because it is one of the most difficult things in our hobby. He is always looking for the new ones.

CQ 160 m Contest

I managed to make 1000 contacts with 60 multipliers (before dupes). The first night during the US/VE opening was a real mess. During the second night there was a pipeline to Georgia state providing the only source of US contacts for me. (Only K8CFU, WA4JXI and AA4MM were the exceptions.) The greatest surprise was to be called by Jim, VK9YS putting an unbelievable signal over here. HKØHEU and OD5BU were other new countries for me. VU2GDG, Gopal also surprised many by appearing for a couple of hours with quite strong signal here.

ACTIVITY

USSR			
UA4CLF	1835 kHz	1820Z	
UA6ECZ	1846	1828	
UZ6AXJ	1841	1830	
UA1AQA	1837	2139	
UZ6LWM	1836	1800	
UZ3TYA	1846	1810	
RW3AO	1845	2012	
RA3YBG	1844	1956	
UA1AOK	1842	1813	
UZ6EWA	1840	1915	
RB5DX	1840	1653	
UB4MDV	1854	1806	
RB5IEP	1847	1810	
UB5IAK	1835	1821	
UB5ZHJ	1831	1836	
RB4IGF	1850	2215	
RB4EXG	1852	2217	
RA2FD	1837	1830	
UC2OA	1838	2140	
UQ2GM	1832	2135	
UQ2PZ	1833	2152	
UR2RGN	1833	2134	
UG6GAK	1835	1820	
UG6GCK	1838	2140	
UA9FD	1840	1826	
UZ9FWW	1834	1837	
UZ9SWY	1835	1843	
UV9FM	1832	2133	
EUROPE			
OL9CTB	1835	1830	
OK2BPU	1835	1830	
OK1NV	1859	1805	
I3LIH	1838	1953	
IV3PRK	1838	2000	
I2BBJ	1833	1625	
IT9EXX	1840	1645	Delta loop
EA3VY	1838	2012	
F3OA	1833	2012	
Y28AL	1836	2136	
OE7TII	1836	2136	
HB9AMO	1840	1705	

ON4UN first station from ON, John wasn't very strong but readable.

ON6BY	1835	2220	
PA3BUD	1835	2234	
G4DKG	1831	2207	
G3BDQ	1832	2205	
YU2ZZ	1832	2215	
DL6PP	1834	2215	

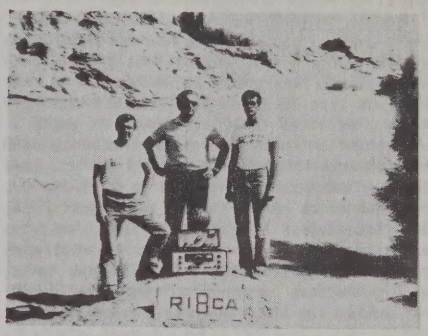
7X2HM, Boualem in Tipaza has built the transverter for his Ten-Tec transceiver and is active with 90 W output into a dipole antenna linked as a T antenna through home brewed tuner. He was on 1840 SSB at 1740 Z, he also works some CW. QSL via Call Book address.

TI9W was reported active on Eu mornings around 0400 Z on 1839.

S79LJ (op. G4LJF) and PZ1DT were also worked from Europe.

KL7Y and KL7H made many North and West Europeans happy.

HZ1HZ is back on top band.
LU7XP was worked by Europeans with good signal.
KA1IJ is going to Ogasawara and will try to operate 160 too.



RI8CA KARSHI DXpedition was carried out by (L. to R.) UA4WCE, UA3GEA, UA4WF and worked a number of station on 160.

ON4UN REPORT:

TOP BAND ACTIVITY

My friends who are experts and have been on 160 for a long time, have told me that I have witnessed the best conditions on top band for years during the first weeks of January. Maybe. I hope it is not true, but it was amazing. In certain ways, 160 has been like I expected, in other ways it has surprised me. I had always looked at 160 as just an extension of 80 meters, where things would be merely more difficult. I have witnessed some distinct differences: polar cap absorption is less pronounced than on 80. Working KL7 and KH6 seems to be much easier on 160 than it is on 80. Then there is this slow QSB, with every long period, something I have never experienced on 80.

My 90 foot vertical seems to perform quite well on top band, and the Beverage antennas seem to be as valuable as on 80 m. In three and half weeks I worked over 1500 stations, in 79 countries, 47 states and 26 zones. The missing states are Idaho, Wyoming and Utah. Any help with completion of my 160 m WAS is welcomed. I understand that OH1XX has also worked 3Y1EE on 160 meters!

I understand SU1EL has been on 160 SSB, and has given a much needed zone to some of the top band DXers.

While the propagation was extremely good to the North and Northwest during the first few weeks of January, it calmed down during the last week in January and the first couple of weeks in February. Late in February the band opened up very well to the Far East. VS6DO is daily on 1832 and often peaking 599 just before his sunrise. I also worked Paul 59 on SSB. Ross, 9M2AX is often heard on 1832 at either 1700 GMT or 2315 GMT. A pleasant surprise has been KC6CS from Western Carolines on 1826. He was solid 559 on March 1st at 2115 GMT (QSL JE1JKL). YBØJH was called by Jack, VE1ZZ on March 2nd at 2210 GMT, but did not reply. I sought him (he was 579) and wanted to pass Jack on, but YBØJH's CW was so slow (about 5 WPM) and his CW copying ability limited to the point that I never managed to hook Jack up with him. The same

station was also worked on SSB on 1834 on Feb. 22nd (2315 GMT). I also worked Jim, VK9YS at his sunrise with good signals. On February 25th, Gopal, VU2GDG was 20 dB over S9 on 2695 around 0000 GMT, helping out with Barati, VU4APR, working Europe and N. America. When I asked him to try 160, he said to go to 1845 "right now." One minute later Gopal was in the log with 58 reports both ways! On Feb. 28 Jim, VK9XS was worked by quite a few Europeans. I was in Germany with my friends of the Rhein/Ruhr DX Club and missed Jim from Christmas Island on 80 and 160 m bands. At this time of writing it is unknown why Jim suddenly disappeared after one day of operating. I hope nothing went wrong.

Barati, VU4APR was going to be a tough one on a top band, as she had no linear and just a dipole a few feet off the ground. But the challenge was great as Andaman is in the difficult zone 26. I had my first sked with her on March 7 at 2330 on 1842. At 1835 I recognized a woman's voice on frequency and five minutes later I gave her 44 report. The QSO was subsequently verified on 80 m. Barati promised to be on 1842 every morning at 2335 GMT. I certainly hope that by the time you read this, many have been able to work her (especially my friend Dave, G3SZA,who needs it for his last zone). (The news that G3SZA has worked the last zone, was a false alarm by The DX Bulletin. Sorry. Ed.) I must admit it was an excellent evening as Paul, VS6DO was solid S9 for at least 20 minutes. Let's hope that Gopal, VU2GDG can come on frequency and help to sort things out.

More to the South, the Australians have been making their appearance, with Mike, VK6HD as a solid beacon (1832 - 1838). VK5KL, VK7BC and VK3ATM were also worked or heard. Peter, ZL3GQ has been the beacon from "down under" on 1832 around 1800 GMT.

Conditions to the West have been peaking up into Central America, the Caribbean and lately (mid March) also into South America, although the QRN level is still massive over the S. American continent. ZYØSB was worked on 1832 in Europe at 2315 on March 1st. It is a pity that this one was not better organized so that more DX stations could have been worked on top band. Other station active were: ZF2KE, TK5BL/FS, HH7PV, HI8LC, J6CQ, J37AH, FM5WS, 8P9HG, TG9NX, HKØBEU, J7Øa, AI6V/6Y5, J74A, V31CV, VP2VA and HR6A.

From South America: 8R1RPN, CP8HD, PT7CB, PT7BZ and best of all, CXØXY from the South Shetland Islands. CXØXY signals were also coming over North America, from Northwest in a similar way as 3Y1EE did on 80 m last month.

Africa has been quiet so far, only station worked here were ZS5LB and TR8JLD.

I worked my 100th country on top band on March 2nd. At the time of writing, my score is 108 countries worked, 33 zones, with some easy ones missing. All this since Jan. 1st, when we were allowed to operate on 160 m. (ON4UN)

Ever wondered what VE1ZZ and his shack look like? Here is the answer: Jack himself, VE1ZZ and his station. (tnx VE3INQ via LZ2CJ)

6 m Corner

Harry Schools, KA3B

1606 S Newkirk St. Philadelphia, PA 19145

It is our great pleasure to welcome Harry School, KA3B as our newest regular columnist. Harry is 30 years old and has been licensed since 1976 as WB3BIS, extra class since 1980. He operated mostly QRP and 10 meter band for two years as DA2AL while with US Air Force in Germany. During this time he got very interested in VHF work, since many Europeans are active VHF operators and hill-toppers on 144 and 432 MHz. He also operated as WB3BIS/HBØ, WB3BIS/HB9 and DA2AL/LX. He was a member of Wiesbaden Amateur Radio Club in Germany and participated in DA1WA/HBØ and DA1WA/LX operations. From his home QTH in Philadelphia, Harry operates only on 6 meters. The only time he gets involved in HF operation is when contesting from AC3T in Delaware. We hope that many of our readers will enjoy Harry's 6 m Corner and find it a source of fresh information about 6 m activities. ——————(VE3BMV/W2)

Welcome to this first instalment of the Six Meter Corner. I am very pleased to have been given the opportunity to help promote activity on the 50 MHz band. It is my hope that the information presented in this column will be of value to both the newcomer and old timer alike. For the next few months I will attempt to cover the basis of 6 meter operation for those that are considering becoming active on the band. However, the primary purpose of this column is to function as a "clearinghouse" for ACTIVITY REPORTS. Please let me know who you are working as well as when and where you are working them. Also, please include Maidenhead Grid Locators of stations being worked. Any and all information concerning 50 MHz operation would be appreciated. Remember, this is YOUR COLUMN and its success depends on audience participation.

As with any band, the questions usually asked by potential newcomers concerns propagation and the level of activity in their respective local areas. Unfortunately, these are two questions that are not easily answered. Back in the late 40's and early 50's before the days of 2 meter FM and repeaters, 6 meters was utilized extensively for local communication over short distances, often employing amplitude modulation. During these years, operators at times enjoyed band openings via sporadic-E layer, but 6 meters was still considered a "local" band. By the late 50's, solar cycle #19 was fast becoming the most intense on record. It was at this point in time that 6 meters was finally viewed as a "DX" band with worldwide propagation via the F-layer of the ionosphere.

The level of worldwide activity during our last solar cycle which peaked in 1979-80 on 6 meters was at times staggering. Propagation via the F2 layer allowed many modestly equipped stations to achieve Worked all Continents. In all, over 100 DXCC countries were represented on the band. Not bad, considering many countries do not have privileges there. On many days when the band was especially good, one would be hard-pressed to tell the differences between 6 meters and 10 meters. At the present, the top 6 meter stations in the world are hovering around the 80-85 countries confirmed plateau. It is a pretty sure bet that with a healthy cycle #22 we may witness the first of many DXCC and DXCA Awards on the band.

With the advent of the Maidenhead Locator System in 1983 coupled with the ARRL's popular VHF/UHF Century Clubs Awards Program, 6 meters witnessed a resurgence in activity during the low solar cycle years. Here in the United States there are probably about 5,000 amateurs equipped with 6 meter SSB operation. As compared to the HF frequencies, 6 meters is much the same when viewing activity on a nation wide scale. Hotbeds of activity include California, Washington, Texas, the Midwest and New England. On the other hand, areas such as Wyoming, Montana, Dakotas, Delaware and Rhode Island have a small number of stations operational. In order to present an objective view of what 6 meters has to offer, a recap of the year 1986 should be in order.

1986:THE YEAR IN REVIEW

The upswing of Solar Cycle 22 is on our doorstep and I know that this alone creates excitement and anticipation for all who love 6 meters. However, let's remember that although the year 1986 was "the bottom of the barrel," many exciting DX events took place. It all began with the fantastic Aurora of February 8th and 9th... perhaps the greatest of all time. Hawaii was worked for the first time by many as far inland as the Midwest states, giving hope to newcomers that the 6 m WAS award is well within their grasp. During this same aurora, Central and South American stations peaking well over S9, provided many with an excellent opportunity to work new countries. It was a weekend that few of us will ever forget.

The sporadic E season started off with a bang during the month of April with quite a few coast to coast double-hop openings. Because of the year's intense E-skip, the ARRL 6 Meter Sprint on May 17th was an operator's delight with many stations working in excess of 80 grid squares during the short 4 hour contest. The top station was WA4NJP in Georgia who amassed 245 QSOs in 100 grinds. Not far behind was WA1OUB in New Hampshire who tallied 203 QSOs in 109 grids.

During the early part of June, Jim Trybig, W6JKV, "Mr. 6 Meters" himself, created excitement by travelling to St. Vincent (J88) with Dick Hanson, N4HSM. Dick, N4HSM/J88 had 270 QSOs in 9 countries and Jim, W6JKV/J88 had 350 QSOs in 11 countries. After this very successful DXpedition, Jim then travelled to the Azores and was assisted by Kal, KB6AFZ/CU2. As W6JKV/CU2, 145 QSOs took place with 9 countries being worked, activating another new rare country for many.

The June VHF Contest was probably one of the better ones on record with widespread sporadic-E. DX such as W6JKV/J88, N4HSM/J88, OX3LX, along with a host of KP4s made for an interesting time. Other DX locations worked from here, in the states, included 8P6 Jamaica, VP9 Bermuda, VP2M Montserrat, YV Venezuela, XE Mexico, G England and the United Nations Headquarters Station, 4U1UN. To exemplify just how good conditions were during this event, the top single operator was Lisa, KAONNO from Colorado. Lisa worked an impressive 481 stations in 183 grid squares for 88,023 points.

During the summer months the band was open many days. However, openings to Europe were far and few between for most. With the current "6 Meter Boom" taking place in the United Kingdom, it was hoped that the extra added activity would increase the odds of completing transcontinental QSOs. Unfortunately, the band only opened on a few occasions. The big news during the fall months was the aurora which took place on the evening

of September 12th. This auroral opening provided night owls with a rather intense 3 to 4 hours of coast-to-coast DX. KL7NO in Fairbanks, Alaska, was worked by K8WKZ in Michigan among others and was also heard in New England. About a month later on October 14th, Al, KH6IAA in Hawaii made over 50 QSOs with stations as far east as Florida during a magnetic disturbance! For the "BOTTOM OF THE BARREL" I would say that we fared pretty well! Maybe not for personal accomplishments on 6 meters for some of us, but as a whole I think we did okay.

So, as you can see, 6 meters isn't just a local band as some would want you to believe. I'll admit, there are areas in the states where activity is sparse and there are times when the band may not open for weeks at a time. However, these are the factors or variables which make operating on this band exciting. You never know what to expect. Next month I will begin covering basic such as rigs and antennas for anyone who is contemplating giving the band a try. The spring/summer DX season is right around the corner and now is the time to start planning. Also, next month I will include my latest North American 6 meter beacon list.

CANADIAN MARITIME ACTIVITY

The following is a list of stations that have been active over the past few years from the Maritime Province of Canada. This information should be very useful for grid-hunters.

LABRADOR,	FO62:	VO2AB, AG
NEW FOUNDLAND,	GN37:	VO1DI, JN, LO, MP
NEW BRUNSWICK,	FN57:	VE1AXW
	FN65:	VE1ALQ, ASJ, BF, RG
	FN76:	VE1BUF
NOVA SCOTIA,	FN63:	VE1UT
	FN74:	VE1YX
	FN84:	VE1BNN
PRINCE EDWARD ISLAND,	FN86:	VE1BPY

HAITI

For quite a few years, Pierre Catala signed as HH2PR from Port au Prince. Pierre was quite active on 6 meters and he even had a beacon operational on 50.023 MHz. I recently received a letter from him and it seems that he left Haiti and is now signing WA1UAT/5 in Texas. Haiti should be on again by HH7PV. Bill Sheedy, K1ZFE has sent HH7PV a Swan 250 and a 5 element beam. Hopefully, this equipment will be up and running in time for the start of the Spring DX season.

GREENLAND

Currently there are two amateurs active on 6 m from Greenland: Bo, OX3LX and Herluf, OX3RA. Bo monitors 50.110 MHz quite regularly and is operational with 150 W to a 5 el. beam. Herluf is the custodian of the OX3VHF beacon which was once operated by OX3BX. Tommy, OX3BX now resides in Spain and uses call OZ2BQ/EA7. The OX3VHF beacon is on 24 hours a day on 50.045 MHz and is located on the Island of Simiutaq, which is about 30 km Northwest from Julianehaab. The beacon runs 20 W to a ground plane antenna in grid square GP60qq (100 m ASL). QSL for OX3LX to: Bo Christensen, Box 187, DK 3920 Julianehaab, Greenland; and for OX3RA: Herluf Rasmussen, Box 165, DK 3920, Julianehaab, Greenland.

ALASKA

For most of the 6 m operators living in the Southeast or along the East Coast, a contact with KL7 is usually the last needed for the WAS award. Although Alaska has been heard and worked during the last few years in the Midwest and New England, it just hasn't been heard in the Mid Atlantic or Southeastern states. Until the sunspot numbers increase, many operators will have to content with 49 states worked. There are still few KL7 operators that monitor the band regularly and take advantage of band openings. The following are the active stations form grid squares:

BP51: AL7C, KL7WE, JAI, IKV, CDG, JJH, W5AHO/KL7
BP54: KL7NO
BP64: K4TXK/KL7, KL7JIZ, WL7X
BP65: KL7GNG
BP74: KL7DJ
CO45: KL7IBG

HF COORDINATION FREQUENCIES

For anyone that may be interested in getting started on the 6 m band, there are a few HF frequencies where 6 m enthusiasts can be found: 28.885 MHz (used for 6/10 m crossband work), 21.366 (information exchange), 3.782 MHz at 8:00 p.m. EST East Coast net every Tuesday.

SMIRK - Six Meter International Klub

This club was formed by a group of San Antonio, Texas area amateurs back in the 1970's. It is a world wide association dedicated to both the study and practical application of RF propagation on the 6 m band. SMIRK disseminates scientific and technical information to radio operators and scientists, and makes every effort to promote 6 meter operation. Along with encouraging and supporting courtesy and good operating practices, SMIRK actively supports new countries on 6 m through equipment loans. Special activities, new awards, social functions, equipment updates and DX information are publicized in the "SIX SHOOTER," which is SMIRK's quarterly publication. This organization also sponsors an annual SMIRK Party Contest each Spring/Summer. The SMIRK Secretary is Ray Clark, K5ZMS, SMIRK #1 and it's president is Tex Kennedy, N5TX, SMIRK #3.

SMIRK NETS: (all times are local time)

TUE 9:00PM	K5ZMS	50.200 MHz SSB	TEXAS
THU 9:00	WA5OLT	50.170	N TEXAS
SUN 8:00	K1DAT	50.175	NEW ENGLAND
SUN 9:00	WA5OLT	50.170	N TEXAS

As of August 1986 the SMIRK membership numbered 5,096 with all 50 states and 81 countries being represented. To become a member of this fine organization, one must work six (6) current SMIRK members on the 6 m band. A list of these contacts which must include date, time, call, name and SMIRK number should be sent along with $6.00 to SMIRK, 7158 Stone Fence, San Antonio, TX 78227. For those not yet active on 6 m, an associate membership is available for the same fee of $6.00. Members will receive a membership certificate suitable for framing and their own membership number. Also, a roster of paid-up club members will be provided. In order to receive the SIX SHOOTER publication after the first year of membership, $3.00 in dues is required to be paid in January of each year.

I hope that many 6 m operators will find RADIOSPORTING as an excellent vehicle to communicate their ctivity and expeditions to rare countries and squares. The material received before the end of the month will make the next issue.

If you have any news, comments or questions, please write to my address listed at the beginning of this column.
73 (KA3B)

NOVICE ENHANCEMENT
EFFECTIVE MARCH 21

Novices are back on phone - for the first time since the 1960s. In its Report and Order on Novice enhancement (effective March 21, 1987), the FCC expanded the Novice 10 meter allocation to 28.5 MHz and awarded new VHF/UHF allocations at 1 1/4 meters and 23 centimeters. Phone operation is now permitted on all three bands.

In brief, on 10 meters Novices (and Technicians, who share Novice low band privileges) may now use digital (F1B) as well as CW from 28.1 to 28.3 MHz, plus CW and SSB from 28.3 to 28.5 MHz. The power limit remains 200 watts. On 1/4 meter band they are authorized all modes from 222.1 to 223.91 MHz, with 25 watt power limit. On 23 centimeters, the Novice band is 1270 - 1295 MHz (all modes), but with only 5 watts.

There is one important limitation: while Novices will be permitted to use repeaters, they won't be permitted to be repeater control operators or trustees. Note: contrary to a widely circulated but erroneous interpretation of the new rules, Novices' signals may be repeated outside the Novice subbands, just as Techs' signals can be repeated on 10 m cross-linked repeaters or through satellites. This means that Novices will be able to communicate directly with higher class Amateurs on the other VHF/UHF bands through cross-linked repeaters.

They will have to pass a more difficult exam, however. Instead of 20 questions, they'll face 30 - with the additional ten testing knowledge relevant to the new privileges.

220 MHz band in danger!

In a notice of Proposed Rulemaking dated just two days after the Report on Novice enhancement, the Commission proposed reallocating 220 - 222 MHz to land mobile service use only!

As justification, the FCC cites "light loading" of the band in comparison to 2 m, using ARRL's Repeater Directory listings as evidence, which it isn't. 220 MHz supports many control links and a large, dynamic, and growing number of packet and other data communication users who have come to 220 MHz because 2 m could not accommodate them. It's obvious that FCC's right hand doesn't know what left hand is doing! You don't give 80,000 new users access to a finite band of frequencies, then cut that band by 40%!

Send your comments on Docket 87-14 to FCC before April 6 (may be extended) in six copies. (Westlink, Ham Radio Magazine)

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80 m DXing

John Devoldere, ON4UN, AA401

PO Box 41
B9000 Gent, Belgium

I am a poor reporter on the 80 m band conditions this time. It has to do with the fact that I spent all my time on top band, now that we finally got 160 open in Belgium. Judging from the conditions on top band, the 80 m conditions must have been excellent the first week of January.

PETER I ISLAND. After a solid three and half weeks on top band, the Peter I Island DXpedition called me back to 80. I could not miss that one. With it here comes the story of more skewed path on 80 m.

There must have been many requests to 3Y1EE and 3Y2GV to come to 80 meters. The frequencies were known, the operating time had to be between 0430 - 0630 GMT, when the sun is lowest on Peter I. We also heard that they might stick to operating high bands, where the productivity is much better than digging in the noise on low bands. We kept hoping that they would show up on 80, I was getting up every day at 0400 or 0500 Z.

On January 27 and 28 we had excellent conditions to the West Coast. All the big guns were sitting on 3780, and we were working Argentina and Chile with good signals. At 0620 on January 28, after one of his many courageous calls, Dale, K6UA was rewarded with the first 80 m QSO from Peter I Island. I heard Dale working him, but could hardly hear Einar, 3Y1EE on my SW Beverage. Switching around, I found that his signal was 57 on the Beverage beaming 320 degrees, which is 90 degrees opposite to the great circle direction!

Dale told Einar that I was on, and Rich, K2RR passed me the mike and a minute later I was in the log. Next was Bob, W6RJ, and then I heard Einar say: "Just wanted to test the propagation, will be back tomorrow." I guess there must have been 10,000 disappointed low band DXers on that frequency. But Einar has definitely made up for that short and disappointing appearance.

On Jan. 29, Einar appeared around 0545 and immediately started to work split frequency. Again the propagation was skewed path, across North America and his signals were peaking S7 as the previous day. The next few days, Einar has shown up every day on 3780, but in Western Europe the signals were down several S units from the previous two days. Scandinavians were working 3Y1EE quite easily. I have no knowledge that they operated on 80 m CW, apparently because of the narrow bandwidth of their antenna. I think this expedition has to be considered as very successful for the low band operation.

With Peter I expedition we saw some really good operating practice on 80 m. Einar proved that split frequency does work. Just about everyone serious about 80 m had the chance to work him. No lists, no shooting fish in a barrel. At last an incentive to do something about our signals and antennas. This is real Amateur Radio. The same can be said about XF4DX. Well done and thanks!

The XF4DX expedition was worked quite easily in Europe on Feb. 7th. Signals were well over S9 on 3795 and the operating was excellent. They worked Europe on 3695 - 3700.

Cocos Keeling. Less than a week after the XF4DX expedition, Jim Smith, VK9NS showed up on 80 m SSB from Cocos Keeling as VK9YS for the first time on Feb. 12th. On the 14th, he had a very good opening to the East Coast around 1235 - 2350 GMT working split 3799/3803. I have been listening for hours and on my 120 degree Beverage his signals were solid Q5 and a honest S9 at least one hour every night. Good show, Jim, we all appreciated your courageous struggle!

Let's have more of those split frequency operations. The behavior of some European DXers when working split frequency is often disappointing. Either they don't copy the DX station well (maybe well enough for a 44 exchange from a list) and consequently do not understand the instructions and keep calling. The other alternative is that they are just plain bad operators. When the DX station comes back to a call (or gives a part of a call), there is no point to call again. It just slows down the operation. The only alternative for the DX station is to spread the callers out over a much wider spectrum, or.. work from a list. I am sure this is the only reason that has driven Jim occasionally to work from a list on 80 during his last days of operation. I am sure this has been a new country for many on 80 m. My last QSO with Cocos on 80 m goes back to the Don Miller era (VK2ADY/VK9).

Glorioso Isl. On February 13th, the new crew arrived on Glorioso Island, but the linear which had been promised had not arrived in time to be taken along. Later I found out from F5VU that they would not try 80 meters. Did we not have a good advocate in this case?

Andaman Isl. On the February 20th, the long awaited expedition to Andaman Islands, VU4APR came on the air. Barati may not be the most proficient operator but after a slow single frequency start on 20 and 15 meters, she quickly upgraded her operating. I sent Barati all the instructions on operating times, frequencies, windows, etc., as well as one of my Beverage transformers and installation instructions. One Beverage should cover the Europe and East Coast of US. Barati quickly got hooked on low band operating and she has shown up almost daily at either our sunset around 1700 GMT or her sunrise at 0000 GMT. Her signals have been varying between S4 and S9 on one occasion, with a short and very distinct peak right at her sunrise. The short peak must be due to the low height of the antenna she is using.

Christmas Isl. Jim Smith had a very strong signal from Christmas Island, VK9XS, on February 28th, but that's the only day he was heard.

CYØSA and CYØSB were not too great an operation. CYØSA had a very strong signal on 80 m CW in Europe. But I think that most stations worked them for lists. Even on the higher bands! Another one for the worked all list award.

Peter, OH1XX plans to rebuilt his 3 element full size 80 m yagi, which he lost due to the snapping of a tower guy cable in a bad storm. Peter is also looking for other potentially interested hams as he would build a small series of these antennas. Anyone interested, contact Peter Kolemainen, OH1XX, Box 29, SF-21530 Paimio, Finland.

DXing on 80 now and then

I recently went through all my 65 log books, holding 105,000 contacts to file all 80 meter DX and West Coast contacts. The outcome is amazing. Of course it tells a lot about my activity over the years, but also about the general 80 meter activity.

Chart 1 shows the new countries worked on a yearly basis since 1961 and includes also deleted countries, now totalling 320. It took me 3 years to work my first 100. Nowadays its done on one contest weekend.

Chart 2 shows the DXCC total according to present DXCC list. I worked my first West Coast (W6, W7, VE7) in 1963. Watch the evolution of West Coast contacts over the years. By the way, I put my first Beverage to the US up in 1970. (Chart 3)

From 1980 to 1982 the activity was very low. The main reason was the enormous amount of deliberate jamming every day on the 80 meter band. The worst jamming stopped eventually when a station in Ireland got caught and had his license revoked for several years. At the same time I got involved in RTTY, AMTOR and County Hunting. I am the proud owner of USA-CA award #417, for having all 3086 counties worked and confirmed. I made a bunch of really good friends with county hunting. County hunting from Belgium is DXing as well!

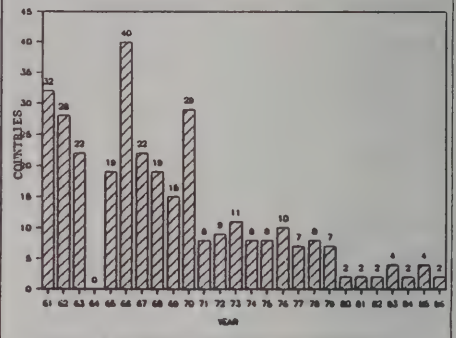


Chart 1. ON4UN - 80 m countries by year.

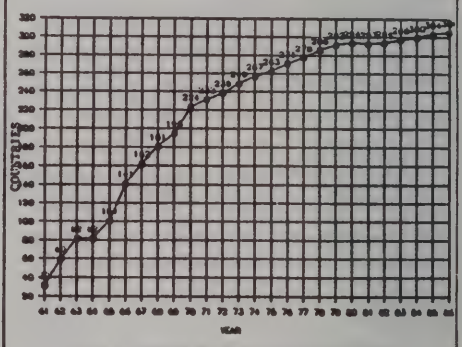


Chart 2. ON4UN 80 m countries without deleted - total by years.

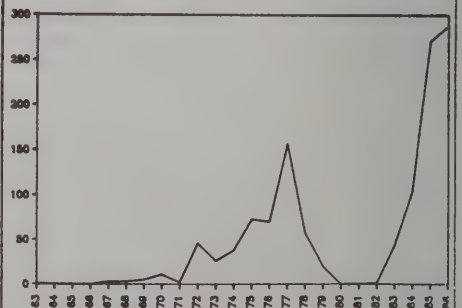


Chart 3. ON4UN to US West Coast QSOs/year

RESULTS

FIRST IRSA RADIOSPORTING WORLD RADIO CHAMPIONSHIP

Walt McGugan, W3FG Yuri Blanarovich, VE3BMV

World Champion Phone – Juha "John" Tuovinen, OH1JT/OH7JT operated OHØBH.

The first running of our new contest baby is behind us and the results are here. Considering the confusion with scheduling and rescheduling the date for our championship, the lack of publicity in overseas magazines and poor propagation, it was a success. The rules were sent out in time to the major national radio societies. Unfortunately, not many of them published the rules in their magazines. Perhaps they considered our contest just another QSO party, or the rules simply disappeared in the mail pile. This year we will try to have the rules out sooner. We need your support in this area. If you like the contest and its rules, please spread the news, make a copy of the rules and forms and pass them around to those who are interested in the contest.

Propagation conditions were not the best. Those who decided to operate

1986 WRC TROPHY WINNERS

COMBINED
PHONE & CW

W3GM station
(operators: W3GM, W3FV, K3IPK)
World Champion
Multi operator, Multi transmitter,
W2PV Memorial Trophy donated by IRSA

World Champion
Jeff Bolda, WC4E
Single operator, Single band
Yuri Blanarovich, VE3BMV Trophy

World Champion 160 m
Dr. Wally Stefanoff, LZ2CJ
Single operator
John Summach, VE3MFA Trophy

European Champion
Ben Buettner, DL6RAI
Single operator, All band
Bob Cox, K3EST Trophy

PHONE

World Champion
LZ7A Club Station
(LZ2PO, LZ2HE, LZ2DF, LZ2-E-72)
Multi operator, Single transmitter
Greater Milwaukee DX Assn. Trophy

Canadian Champion
Dale Green, VE7SV
Single operator, Single band
George Furtado, VE7EIK Trophy

CW

Champion
K3WW (+ KQ3F)
Multi operator, Single Transmitter
RADIOSPORTING Trophy

World Champion
OHØBH, (Juha Tuovinen, OH1JT opr.)
Single operator, All band
IRSA Trophy

USA Champion
David Jones, K3JLT/2
Single operator, 160 m
Dennis Peterson, N7CKD Trophy

COMBINED MODE - CW & PHONE

HIGH POWER

SINGLE OPERATOR - ALL BAND			
1*	KC7V	AB	245088
2*	N5ECT	AB	206990
3#	DL6RAI	AB	111390
4*	K5ZD/1	AB	105228
5*	SP5PBE	AB	91086
6	KS7T	AB	64550
7	I2VXJ	AB	42072
8	WE6G	AB	28133
9	W4KMS	AB	5964

SINGLE OPERATOR - SINGLE BAND			
1#	WC4E	14	123150
2*	IK5BBP	14	85098
3*	PA3CEF	14	70526
4*	OH6EI	7	65545
5#	LZ2CJ	1.8	50617
6	KV8M	14	31214
7*	W5FO	3.5	17504
8*	NG7K	3.5	14716
9#	K3JLT/2	1.8	11375
10	N9DMT	3.5	6044
11	OH6YF	14	4919
12	OK2ABU	14	1827
13	K7SP	1.8	1630

MULTI SINGLE			
1*	LZ7A	AB	1486140
2*	K3WW	AB	854188

MULTI MULTI			
1#	W3GM	AB	877387

LOW POWER

SINGLE OPERATOR - ALL BAND			
1*	VK2APK	AB	117216
2*	W4WKQ	AB	53505
3*	I3FDZ	AB	52263
4*	KB9PC	AB	28422
5*	N6NF	AB	23724
6	KI2D	AB	23682
7	KA5W	AB	19669
8	OH3TQ	AB	16348
9	NK8Q	AB	16014
10	OH2BBF/M	AB	13086
11	LZ1KWS	AB	8120
12	YU7SF	AB	3620
13	IOKHP	AB	1084

SINGLE OPERATOR - SINGLE BAND			
1*	N4NX	14	7586
2*	IO2KYM	21	6701
3*	VU2UR	21	5192
4*	W2HG	3.5	3580
5*	UG6JJ	14	3514
6	VE2AEJ/3	14	2916
7	WF5E	14	2085

QRP POWER - ALL BAND			
1*	G4GIR	AB	6864

Scores are listen in the following order: Place, Call, Band, Score. # denotes trophy winner, * denotes certificate winner.

this first historical IRSA event had a lot of fun. The "underpriviledged" low power and QRP stations especially enjoyed it because finally, they were able to compete with those in the same category.

Looking at the results: In the battle of armies - the club competition, we congratulate the Frankford Radio Club for being the first winner of the WRC club competition with a combined score of 2,616,153 points. They will receive a plaque at Dayton Hamvention for their effort. The world's best contest club did it again!

The next heavy competition were multis. In the Combined CW and Phone category the Bulgarian team of LZ7A, with 1.48 million points, managed to beat even the multi-multi team of W3GM. LZ7A team of LZ2PO, LZ2HE, LZ2DF, LZ2CC and LZ-E-72 will receive the Greater Milwaukee DX Assn Trophy for being the World Champion in Phone Multi Single category.

W3GM team of N2BA, W3FV, K3IPK won W2PV Memorial Trophy donated by IRSA for the World Champion in Multi-Multi category in combined mode.

For our combined category competition we included only the stations who submitted logs for both parts - CW and Phone and were competing in the same category on both modes. Some of the outstanding scores on one mode exceeded the combined scores. This makes it interesting and rewarding for those more versatile operators who enter the contest with a mike and key. I am sure that in the future we will see a tougher competition for the top spot in the combined mode categories.

In the High Power category, the All Band winner was KC7V ahead of N5ECT and DL6RAI, winner of K3EST Trophy. The low power champion comes from Australia, VK2APK, who was well ahead of W4WKQ and I3FDZ. The QRP category has seen the lonely G4GIR.

This year's single band categories were lumped together due to the number of entries. The kilowatt group was led by the VE3BMV Trophy winner WC4E, IK5BBP and PA3CEF, all on 14 MHz. The 100 watters were led by N4NX, IO2KYM and VU2UR, a 20 and 15 meter mix. We should see a heavier competition in the years to come in the combined category competition. This is the first time contestants were allowed to compete in both modes on the same weekend. Our scoring systems seems to be well balanced as far as the modes go. CW and phone scores are comparable. A one point advantage should be just about right to compensate for the slower pace of CW operating.

The Multi-Multi Champion on CW was W3GM who operated with W3FV. LZ7A's team managed to win the CW Multi Single category and even outscored the multi multi station. K3WW with KQ3F ended up in second place and are the winners of RADIOSPORTING Multi Single CW Trophy.

The World Champion on CW is OHØBH, operated by the 25 year young Juha Tuovinen, OH1JT/OH7JT, who gets the IRSA Trophy. He managed to outscore just about everybody regardless of mode. A super effort under not so good band conditions. The tough battle for second place was won by KBØG beating OH1HS and N6ND.

In the High Power Single Band category the winner is WC4E, followed by KC8C/3 and K3IPK, all on 14 MHz. Our 160 m columnist, Wally, LZ2CJ operated his favorite band and ended up in the middle of the field, ahead of many stations operating on more productive bands. Wally wins the VE3MFA 160 m World Champion Trophy. K3JLT/2 is the winner of N7CKD US 160 m Champion Trophy.

There were more stations in the Low Power category than in the high power, proving that this structure is long overdue. Now the Little Pistols can fight amongst themselves. The clear winner on all bands was KA9OKH ahead of N3BNA and NA1R. In the single band low power bunch the winner is W9WAQ beating I4YTE and AA4M/6. Next year, when we will fine tune the sorting program, we will have each band listed separately, with a lot more entries, we hope. There was one low power multi UZ4FWE.

The QRP bunch had the most fun as we see by their comments. The all band QRP king is G4FDC, followed by DL4FN and W1HUE. The single band scores were dominated by the 20 m entrants OH3GD, KIØF and G4GIR.

The phone portion multi multi winner is the W3GM team operated with the help of N2BA, W3FV and K3IPK, followed by IO1CCL and JA1YWX. The Multi Single camp was again LZ7A with the highest multi score, ahead of K3WW and SP9PDF.

Single operator, high power categories were won by "confusniks" KT3M and KM3T (is there an easy way to remember who is who?). Rob, KT3M takes home the RADIOSPORTING Phone Champion Trophy for beating N4UH and KC3EK. KM3T dominated the single band crowd of 14 MHz entrants. VE7SV came in second and won the VE7EIK Canadian Single Band Champion Trophy. K9CLO, N8CXX and KF4HK were fighting for the third spot. Proving that 160 can be better than any other band except 20 m, Wally, LZ2CJ ended up in the 11th spot.

The low power category saw some international competition for the top spot in the all band division. The winner was VK2APK ahead of IO1RBJ and VE3UOT. The single band winner came from 14 MHz - K1TO, followed by DL2BAY and VK5QX.

In the flea power group the all band winner is VE1CBF and in single band division OH3GD.

Congratulations to all winners! Those present in Dayton, will receive their trophies at the contest forum. Those who have a star next to their callsign will receive a beautiful certificate.

A free one year subscription (or extension) to RADIOSPORTING goes to these country champions: W3GM, DL6RAI, SP5PBE, IK5BBP, PA3CEF, OH6EI, LZ7A, OK2ABU, VK2APK, OH2BBF/M, YU7SF, VU2UR, UG6JJ, VE2AEJ/3

We are still looking for sponsors of trophies. If you like the contest, say so with a trophy. Also, please join our IRSA, your dues help to cover the expenses we have with trophies, certificates and mailing costs. Your dollar will help another contester enjoy the RADIOSPORTING magazine. Some of you may notice that your published score is different - either higher or lower -than your claimed score. Nearly all score changes resulted from mis-counting of multipliers or, in some cases, from math errors --no one was penalized for making mistakes. All logs were checked for correct multiplier counts -in some cases I found some that were missed.

One area that caused a lot of confusion was in counting multipliers for the countries where the call area was the multiplier. For those countries, you could not also claim a multiplier for the country. For example, JA1 and JA2 were both multipliers, but you could not also claim a multiplier for Japan. Mobile stations also caused some confusion. You could count 1 multiplier per mobile group (/AM, /MM, /M) per band --but not one multiplier for each mobile station worked.

The IRSA would like to thank the following stations for submitting check logs: OK1DWJ, KA7FEF, SMOCSX, LA8CE, RA6AR, SM6KND, LA1HCA, LZ1HP, LZ2KZA/P, OH5OZ, LA9OI, LA8CJ, UW6HS, UZ9XXM, and UI8BAA.

The next IRSA - RADIOSPORTING WRC contest will most likely be run on the second full weekend of October. We could not reach an agreement neither with the Californians nor with the Scandinavians in order to land our contest on the end of September. There was too much of tradition at stake. So as not to lose our friends we changed the date. The rules will stay the same. We will be available in Dayton for your comments and suggestions. See us at the RADIOSPORTING booth #430 and the hospitality suites!

Finally, many thanks to all the participants and to those who sent in logs. It's not too late to send your comments to RADIOSPORTING for consideration for next year's contest. (W3FG+VE3BMV)

CONTESTERS COMMENT:

DL6RAI: Not much activity this year but will be back in '87. LZ1KSN: A very nice, contest, but not very popular. Hope to do better next year. 34% of my contacts were 59001. HH2WL: Your contest caught me by surprise so I was able to make only a few contacts. There's not enough here to be competitive, but I wanted to send in my log to show my support and help in your crosschecks. I would appreciate receiving subscription information for your magazine. It sounds interesting. OH6GZ: Thanks for the contest. Hope there are more stations next year. LZ2CJ: Not bad for a first time ever contest! Hope activity will be higher next year! NE9O: Thanks for the new contest. W3GM: Hope IRSA WRC will get world wide acceptance. G.L. W3BGN: Very difficult - conditions not as bad as score looks but low activity on 21 MHz & rag chewers unwilling to participate created lots of work. N2RM: Activity not real high but it should be better next year. I like being able to work both stateside and DX. K5ZD/1: Great activity on phone! I like both modes on same weekend. Good warm-up for CQ WW. OH9UW: Tnx FB contest. KC7V: No DX on 40m -all below 7.1 and not listening up -was frustrating but had a great time for 1st WRC. Hope it continues. KC3EK: Ran out of 20m dupe space for "G's". Poor conditions on 40m. VK5QX: Sorry I was not able to put in a greater amount of time in the contest. Better than 1 contact per minute seemed not too bad. W7BYK: Trying a new computer program. KE7X: Great contest. I'll be back next year. I'd suggest USA stations send state as well as RST & number -that would allow people to look for states needed more easily. N9EAJ: What happened to 40m phone! W5FO: Enjoyed it. See you again next year. IK5BBP: I think this will become a very popular contest. Found most JA's were working the ZL/VK test though. VE7SV: Need better band condx. KBOG: Good turnout for the first year -I hope the Asians and Africans find out about this one for next year. Couldn't put in the full 22 hours due to other commitments. DL4FN: It was a really fine contest, working 100 QSOs with only 5 watts and 43% of them are DX! I will take part again next year. K3WW: Tremendous potential in this contest. NB9C: Amp died first night -so in two categories. Very nice contest. N4UH: Sure was a lot of participation in contest although 84% of stations worked gave a serial number less than 25. I liked it; it does have something for everybody and its lively. K7SP: Vertical blew up during test -SWR to infinity -3-500Z plates turned yellow! VE7AIK: Propagation very poor between 0100 -1500. Maybe it's the mountains! OH6EI: I think that the rules of this contest are fair. Unfortunately, the information of the contest has not spread yet. Anyway -nice contest. Thanks! DL1TH: Vy tnx fb contest. Hope to work also in 1987. WF5E: Thunderstorms all weekend. Only could operate 2 hours. Terrible band condx. Looking forward to next year. Great contest. IO2KYM: Lovely contest! VU2UR: The contest information was not widely circulated and I had to tell many hams about it, taking some time in the process. NOFFZ: Entered CW only. Not a serious contender; still getting acquainted with my FT757GX. Also, my antenna is a 14 foot pole out of 2nd floor window (with tuner, of course) and I enter these things just to see how well it gets out --HI! WOKP/7: Glad to see QRP class in your contest. IK6ASR: I've been on radio for five hours only but with a lot of pleasure. See you again in 1987. W2JEK: Had a good time working the contest. IO1RBJ: CU next year. This is going to be contest #1 in the very near future. IOKHP: Very interesting contest. YU7SF: This is my 1069th contest. LA2AD: The many Italian stations indicate enhanced short skip conditions, with some openings to USA/Canada. Japan, Australia signals were totally absent. K2SD/4: Nice contest, but having to sign /4 sucks! ZS6BRZ: The boys in the VK/ZL contest said I was intruding!! PA3CEF: The participation in Europe wasn't that great. The contest rules were not published in our national magazines, so almost nobody in the Netherlands knew about it. The participation of American stations was very good. Not making much points working N. America although it is nice QSO'ing with them and it is also nice to be for most of the stations a multiplier. I didn't have problems with other contests. Hope next year there will be much more amateurs in the WRC contest. K6NA: Hope to give it a good effort next year. Let's hope for better conditions. NG2X: Very little time for the contest unfortunately --next year though! KG6DX: I like the idea of phone and CW the same weekend. I2VXJ: Poor participation in EU -great in North America. Best thrill -being called by KX6AO in a quiet band. IK2DZN: Very good regulations. Unfortunately VK/ZL in the same weekend -QRM! KC8C/3: Don't think the idea of another autumn contest will catch on. PP2ZDD: Interesting contest with good promise for subsequent years. OH5BA: An interesting contest, but not too many participants. Hope it gains more popularity during years to come. If possible, I will participate also next year. N8CXX: Good test to check out the new antennas. VE3OZB: Hope to be able to work contest full time next year. Also CW section. W2HG: Looking forward to having this contest develop into one of the good ones! K3ND: Let's hope for more activity and more sunspots next time. KS7T: I don't know whether it was the low sunspots or because this was the first IRSA contest but the "lid" factor was way down. Only the true blue die-hard contest types braved this one. Kept things friendly, but also kept QSO rate down, hi! From this QTH when you put the beam to JA and nothing happens on 20 meters -you just know something is amiss! W2FTY: Good contest format. Too bad condx were so rotten! VE3UOT: Great contest -lousy condx. OH1HS: Thanks for the contest. Here in Europe it was very poor activity. Much contesting all long autumn. Very short deadline. (Add rule -club stations can be only in multi class.) K9CLO: Condx excellent and good participation. Good contest -some EA test confusion. LA7SI: Promise to do it better next year! I5MXX: Some trouble with the VK/ZL test. Very poor propagation, some openings with JA, but no USA or Europe. VK2KL: When the contest started I was on 15 m. In the first 25 minutes I made 25 contacts, all 59001. Was this the right weekend, is my clock still going, did I start too early? Hooray for 59012. W7KZK: Enjoyable. Tuff sledding for the most part. No JA runs as anticipated on Sunday afternoon. My keyer kept hanging up on me. Very happy to catch some activity on 15m. Very little Europe activity into this part of the world, and only 1 South American QSO. Didn't even hear the LU powerhouse, must have been fishing or something, hi hi. OH2BBF/M: Very difficult to work from mobile on phone. KIOF: Nice contest. This contest brought out the good CW ops. I was impressed. KB7NV: I enjoy a 24 hour contest. KV8M: Great opening into Europe. WA2ASQ: Tnx fb contest! Enjoyed it very much, with more Europeans this could really go good. Keep the date the same and a little promotion will go a long way. Glad to be part of the first contest. It was worth the time just to snag BY1PK. WU4G: Had a devil of a time getting the old rig to key properly with only 5 watts out, but finally got it! Didn't know QRP could be so fun -only wish I had more time to operate -great test -keep it going. AA4M/6: Great rule structure! This contest has the potential to become the #1 operating event of the year -Tnx Yuri. N6EK: I like it! KT2D: The exchange needs adjustment. Almost everyone sends 59(9), even if they can barely hear you, and the few that don't really bollix things up (you think you heard 59(9) and then suddenly realize you didn't) so get rid of it for, say, state for USA, and two first letters of first name or nickname for everyone else. Keep 'em on their toes! I enjoyed this contest more than any other I've ever been in so far, mostly because, for the first time, I not only got answers to my "CQ contest", but had a pileup and DX stations replying. Also very pleased that stations verified calls and exchanges. This almost never happens in other contests so you oftentimes aren't sure if it was you the other fellow replied to. For a first time event with seemingly little publicity, especially overseas, there were a goodly number to work. What surprised me was that I oftentimes had a higher serial number than the other guy; also where were N2AA, W3LPL, K3ZO, N5AU and the other multi- multi types that I always hear (and usually work)? I'm surprised I didn't work or at least hear Yuri. I guess he's busy with the move still. Suggest changing QSO points to reflect DX ala CQWW (1 pt domestic, 2 pts same continent, 3 pts overseas) and band ala WPX (2 X pts below 10 MHz as compared to above 10 MHz). Otherwise keep up the great work. It was a FB contest! W9WAQ: Rotten condx, lack of stations. Enjoy the format. Looking forward to next year. WOHBH: Enjoyed the contest. I hope it becomes even more popular. WOIZV: Good contest, didn't have time available. W1HUE: Were conditions really as poor as they seemed? OH3TQ: Interesting new contest design! Hope next year better forehand info to all contesters. Many thanks! OH3GD: Thanks for the contest. Hope to join it in future again! OH3AC: The club station of Lahti area is pleased to inform you it had a great fun with this contest. We were quite unlucky.... G3ESF: Enjoyed every minute and look forward to No. 2. W4WKQ: I like the scoring format. When propagation returns it should be a FB contest. G3VZT: Hope for more participants next year! Points system should be changed to encourage DX QSOs (or no working own country). I1POR: Low participation in Europe, but think this contest will be popular soon. GM3YOR: Good contest but lacked publicity, many asking "What contest?" KA9OKH: Thank you for the enjoyable contest weekend. I almost missed the fun due to a fall on the steps leading to the shack but managed to get out of the repair shop before the test started. At least I must say I was plenty rested. Band conditions were rather poor but several good runs into Europe on 15 and 20 meters. Due mostly to a high storm QRN level the 160 and 80 meter QSOs were all NA. Using 100w may have added some to the lack of 160 and 80 meter DX. At 5 mins before the test started I heard 5 of the possible 10 JAs but they were all gone when the test started and not heard from till after the contest. Some could have used some (any) Africa QSOs and a few more Asian & South American QSOs. I am looking forward to next year. DJ2ZS: No activity during the day here, no chance at all from Europe. Stopped at 2126 UTC because of behavior of the "big" stations (not sportsmanlike). N9DMT: Enjoyed working both phone and CW contests on the same weekend. N3BNA: Nice activity for first contest. G4FDC: Surely they could not hear me 599 all the time. OK2BBI: And what about a category for YL? OK3IF: Thank you for new FB contest. LA4YW: At last we have got a contest with proper rules. I have no amplifier, and usually I fight against 600 watt operators with my 50 watts. With a 100 watt limit, my unfair time is over, thank you! KM3T: Lots of #001's and #002's were given out; excellent 20m condx.

RESULTS 1986 IRSA WORLD RADIO CHAMPIONSHIP

Scores are listed in the following order: Place, Call (operator), Band, QSOs, Points, Multiplier, Final score. # denotes trophy winner, * denotes certificate winner.

CW - HIGH POWER

SINGLE OPERATOR - ALL BAND

1#	OHØBH (OH1JT op.)	AB	1020	3060	236	722160
2*	KBØG	AB	630	1890	125	236250
3*	OH1HS	AB	517	1526	151	230426
4*	N6ND	AB	569	1693	131	221783
5*	LZ1QV	AB	473	1419	139	197241
6*	KE7X	AB	462	1382	108	149256
7	OH2BCI	AB	390	1170	120	140400
8*	VO1QU	AB	455	1365	102	139230
9*	KA1LZR	AB	422	1266	107	135462
10*	DL6RAI	AB	330	984	113	111192
11	KC7V	AB	435	1305	74	96570
12	WØHBH	AB	313	939	91	85449
13*	SP5PBE (SP5JTF op.)	AB	288	864	91	78624
14*	N5ECT	AB	277	831	90	74790
15	KS7T	AB	300	900	55	49500
16*	IØZUT	AB	171	513	57	29241
17	DLØCW (DL4BBU op.)	AB	141	423	67	28341
18	K5ZD/1	AB	138	414	67	27738
19*	K2SD/4	AB	108	324	55	17820
20	WE6G	AB	105	315	33	10395
21	I2VXJ	AB	53	159	28	4452
22	W4KMS	AB	48	144	28	4032
23	W4KM	AB	14	42	10	420

SINGLE OPERATOR - SINGLE BAND

1*	WC4E	14	551	1653	70	115710
2*	KC8C/3	14	548	1644	64	105216
3	K3IPK	14	504	1501	58	87058
4*	I8RFD	14	330	975	57	55575
5*	OH6EI	7	215	645	67	43215
6*	OH9UW	14	223	666	51	33966
7*	PA3CEF	14	231	689	49	33761
8*	DF1LX	14	218	654	41	26814
9*	DJ2ZS	7	170	510	42	21420
10*	GM3YOR	7	145	435	42	18270
11*	LZ2CJ	1.8	114	336	42	14112
12	OH5BA	14	100	300	43	12900
13	IK5BBP	14	108	316	39	12324
14*	KV8M	14	113	339	34	11526
15*	K2SX	14	119	357	32	11424
16*	W5FO	3.5	128	382	21	8022
17	NG7K (K7SP op.)	3.5	77	229	20	4580
18	OH6YF	14	60	177	25	4425
19*	YV7QP	7	67	201	21	4221
20*	KG6DX	3.5	58	174	20	3480
21*	N9DMT	3.5	80	240	13	3120
22*	NG2X	7	42	126	24	3024
23*	K3JLT/2	1.8	51	153	15	2295
24*	K3LZ	3.5	38	114	15	1710
25*	K6NA	14	41	123	12	1476
26*	W3BGN	1.8	36	106	13	1339
27*	OK2ABU	14	18	54	14	756
28*	K7SP	1.8	22	64	10	640

MULTI SINGLE

1*	LZ7A (LZ2PO LZ2HE LZ2DF LZ2CC LZ2-E-72 ops.)	AB	964	2892	277	801084
2#	K3WW (+KQ3F)	AB	907	2711	164	444604
3*	SP9PDF	14	100	300	25	7500

MULTI MULTI

1*	W3GM (+W3FV)	AB	838	2370	194	459780

CW - LOW POWER

SINGLE OPERATOR - ALL BAND

1*	KA9OKH	AB	452	1352	105	141960
2*	N3BNA	AB	311	933	98	91434
3*	NA1R	AB	278	834	86	71724
4*	UA9YI	AB	229	687	95	65265
5*	W7KZK	AB	278	834	72	60048
6*	I3FDZ	AB	207	615	83	51045
7*	G3ESF	AB	214	642	77	49434
8*	DL1TH	AB	149	444	65	28860
9*	N6EK	AB	195	585	46	26910
10*	LA4YW	AB	157	471	56	26376
11*	WA2ASQ	AB	133	399	59	23541
12*	W4WKQ	AB	155	465	49	22785
13	NB9C	AB	141	423	53	22419
14	KB9PC	AB	140	420	53	22260
15	N6NF	AB	140	420	51	21420
16*	VK2APK	AB	114	342	62	21204
17	K1TO	AB	131	393	48	18864
18*	KA5W	AB	123	369	51	18819
19	KT2D	AB	122	366	47	17202
20*	OH3TQ	AB	103	309	52	16068
21	W2FTY	AB	109	327	49	16023
22*	NK8Q	AB	109	327	46	15042
23	WC6I	AB	121	350	40	14000
24*	OH2BBF/M	AB	102	306	41	12546
25*	NØFFZ	AB	90	270	37	9990
26*	LZ1KWS	AB	76	228	35	7980
27	IK6ASR	AB	71	213	35	7455
28*	YB2FEA	AB	66	198	36	7128
29	DL1ZQ	AB	58	174	33	5742
30	W6DNY	AB	61	183	23	4209
31	NØCLV	AB	59	177	23	4071
32*	SM5PAX	AB	45	135	27	3645
33*	YU7SF	AB	43	129	28	3612
34	W7BYK	AB	52	156	20	3120
35*	HK1IU	AB	37	111	24	2664
36	K2PF	AB	37	111	23	2553
37	DJOKE	AB	38	114	20	2280
38*	F9BB	AB	21	63	21	1323
39*	PA3DKX	AB	22	66	12	792
40	OH6AT	AB	12	33	10	330
41	IØKHP	AB	12	36	9	324

SINGLE OPERATOR - SINGLE BAND

1*	W9WAQ	14	182	546	41	22386
2*	I4YTE	21	100	300	57	17100
3*	AA4M/6	14	147	441	28	12348
4*	G3VZT	7	111	333	34	11322
5*	VK2BQQ	7	100	300	33	9900
6*	UP2BOA	3.5	72	216	27	5832
7*	OH6GZ	14	64	192	25	4800
8*	VU2UR	21	44	132	28	3696
9*	N4NX	14	47	141	26	3666
10*	UG6JJ	14	40	120	28	3360
11*	VK4TT	14	40	120	24	2880
12*	WB9TBU	14	49	147	17	2499

13*	OK3THM	14	42	126	16	2016
14	OK3ZWX	14	38	114	14	1596
15	IO2KYM	21	31	93	17	1581
16*	VE2AEJ/3	14	24	72	16	1152
17*	NN3SI	14	20	60	14	840
	(W4KM op.)					
18*	W2HG	3.5	23	69	12	828
19	OH9TD	14	23	69	11	759
20	OK3IF	14	20	60	12	720
21*	DL1HBT	14	21	63	11	693
22*	UA9CHL	3.5	14	42	11	462
23	OH5FA	14	15	45	9	405
24*	OH7EU	21	14	28	12	336
25*	LA7SI	7	10	30	7	210
26*	WF5E	14	5	15	5	75
27	DL2ZAV	7	5	15	5	75

MULTI SINGLE

1*	UZ4FWE	14	29	87	10	870

CW - QRP POWER

SINGLE OPERATOR - ALL BAND

1*	G4FDC	AB	114	342	51	17442
2*	DL4FN	AB	100	300	48	14400
3*	W1HUE	AB	57	169	37	6253
4*	NO5W	AB	56	168	23	3864
5	KH6CP/W1	AB	27	81	14	1134
6*	W2JEK	AB	21	63	18	1134
7*	SP4GFG	AB	20	60	10	600

SINGLE OPERATOR - SINGLE BAND

1*	OH3GD	14	116	348	36	12528
2*	KIØF	14	78	234	29	6786
3*	G4GIR	14	66	198	28	5544
4*	KB9S	14	75	225	24	5400
5*	OK1HBT	14	42	126	23	2898
6*	KB7NV	14	50	150	18	2700
7*	OX3BV	14	34	102	17	1734
8*	WU4G	14	29	87	18	1566
9*	WØKP/7	7	17	51	8	408
10*	OH6CS	1.8	11	33	9	297
11*	G4BWP	14	7	21	7	147

PHONE HIGH POWER

SINGLE OPERATOR - ALL BAND

1#	KT3M	AB	1280	2557	173	442361
2*	N4UH	AB	927	1854	131	242874
3*	KC3EK	AB	908	1816	121	219736
4*	VK2KL	AB	686	1372	160	219520
5*	KC7V	AB	669	1338	111	148518
6*	ZS6BRZ	AB	477	954	145	138330
7*	N5ECT	AB	600	1200	111	132200
8*	K5ZD/1	AB	369	738	105	77490
9*	PP2ZDD	AB	350	700	80	56000
10*	I2VXJ	AB	330	660	52	37620
11*	LZ1KSN	AB	182	364	87	31668
12*	KE8AZ	AB	306	608	47	28576
13*	WE6G	AB	181	362	49	17738
14*	WE9O	AB	162	324	48	15552
15	KS7T	AB	215	430	35	15050
16*	SP5PBE	AB	201	402	31	12462
	(SP5JTF op.)					
17	WK4F	AB	100	200	48	9600
18*	KL7Y	AB	108	216	44	9504
19	NB9C	AB	139	278	32	8896
20	NA2M	AB	81	162	34	5508
21	W4KMS	AB	42	84	23	1932
22	DL6RAI	AB	11	22	9	198

SINGLE OPERATOR - SINGLE BAND

1*	KM3T	14	1422	2844	108	307152
2#	VE7SV	14	1022	2044	100	204400
3*	K9CLO	14	572	1144	87	99528
4*	N8CXX	14	579	1158	80	92640
5*	KF4HK	14	611	1217	75	91275
6*	IK5BBP	14	473	933	78	72774
7*	VE7AIK	14	501	1002	66	66132
8*	KCØD	14	402	804	70	56280
9*	LZ1YE	14	319	638	59	37642
10*	PA3CEF	14	432	855	43	36765
11*	LZ2CJ	1.8	522	1043	35	36505
12*	VE3OZB	7	260	520	54	28080
13*	N2RM	3.5	259	516	44	22704
14*	OH6EI	7	203	406	55	22330
15	KV8M	14	214	428	46	19688
16*	W3BGN	21	149	298	41	12218
17*	K3ND	3.5	184	368	33	12144
18*	I5MXX	21	139	278	43	11954
19*	NG7K	3.5	181	362	28	10136
	(K7SP op.)					
20*	G3VZT	7	105	210	46	9660
21*	W5FO	3.5	216	431	22	9482
22*	K3JLT/2	1.8	227	454	20	9080
23	WC4E	14	120	240	31	7440
24*	WØHBH	14	102	204	32	6528
25	KO4J	14	65	130	36	4680
26	KC9BC/4	1.8	115	229	16	3664
27	LA2AD	14	68	132	25	3300
28	N9DMT	3.5	86	172	17	2924
29	OZ1AXG	14	45	90	19	1710
30	WB5TDD	14	31	62	19	1178
31	OK2ABU	14	32	63	17	1071
32	K7SP	1.8	45	90	11	990
33	WØIZV	14	23	46	12	552
34	OH6YF	14	19	38	13	494
35	SP6DVP	14	21	42	9	378
36	KA2BXH	14	5	10	4	40

MULTI SINGLE

1#	LZ7A	AB	1338	2676	256	685056
	(LZ2PO LZ2HE LZ2DF LZ2CC LZ2-E-72)					
2*	K3WW	AB	1275	2544	161	409584
	(+KQ3F)					
3*	SP9PDF	AB	49	96	21	2016

MULTI MULTI

1*	W3GM	AB	1169	2333	179	417607
	(+N2BA W3FV K3IPK)					
2*	IO1CCL	AB	519	1038	75	77850
	(IK1's ACX BHL DQE HLH HLI HJS PH					
3*	JA1YWX	AB	70	140	29	4060
	(JM1CAX JO1BMV JF2IWL JN3PYQ ops.)					

PHONE - LOW POWER

SINGLE OPERATOR - ALL BAND

1*	VK2APK	AB	381	762	126	96012
2*	IO1RBJ	AB	245	476	98	46648
3*	VE3UOT	AB	284	566	74	41884
	(VE1BLG op.)					
4*	W4WKQ	AB	256	512	60	30720
5*	CO2CB	AB	352	703	40	28120
6	I1POR	AB	219	438	57	24966
7	KJ4TI	AB	161	322	42	13524
8*	N9EAJ	AB	107	214	49	10486
9*	HH2WL	AB	107	214	37	7918
10*	KT2D	AB	72	144	45	6480
11*	KB9PC	AB	79	158	39	6162
12	I4CSP	AB	84	168	34	5712

13*	N6NF	AB	48	96	24	2304
14	IK2DZN	AB	50	100	19	1900
15	I3FDZ	AB	29	58	21	1218
16*	NK8Q	AB	27	54	18	972
17*	KA5W	AB	25	50	17	850
18	IØKHP	AB	20	40	19	760
19	OH2BBF/M	AB	27	54	10	540
20	OH3TQ	AB	14	28	10	280
21	LZ1KWS	AB	10	20	7	140
22	YU7SF	AB	2	4	2	8

SINGLE OPERATOR - SINGLE BAND

1*	K1TO	14	322	644	50	32200
2*	DL2BAY	14	225	450	62	27900
3*	VK5QX	14	219	438	45	19710
4*	NI7T	14	135	270	53	14310
5*	CQ8DIZ	14	140	280	33	9240
6*	IO2KYM	21	80	160	32	5120
7*	UA9YI	14	70	140	29	4060
8*	N4NX	14	70	140	28	3920
9*	W2HG	3.5	86	172	16	2752
10*	WF5E	14	67	134	15	2010
11*	VE2AEJ/3	14	42	84	21	1764
12*	VU2UR	21	34	68	22	1496
13*	IV3BMV	14	35	70	20	1400
14*	IV3YYK	7	30	60	21	1260
15*	OK2BBI	14	24	48	13	624
16	DF2HL	14	22	42	11	462
17	N5EYT	14	17	34	13	442
18	UG6JJ	14	11	22	7	154
19	SP9AVZ	14	9	18	5	90
20	OH3AC (OH3GD op.)	21	6	12	5	60
21	AA4M/6	21	3	6	3	18

MULTI SINGLE

1*	UT4UXW (UB5XCM UY5JW ops.)	14	131	260	32	8320
2*	KEØCI	AB	40	80	20	1600

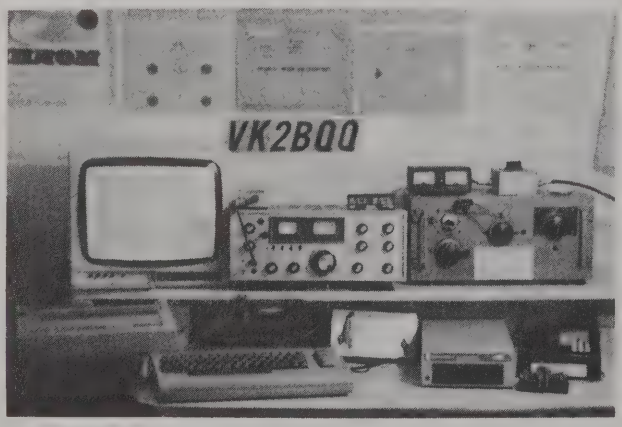
PHONE - QRP POWER

SINGLE OPERATOR - ALL BAND

1*	VE1CBF	AB	80	160	39	6240
2*	LZ2EW	AB	64	128	39	4992

SINGLE OPERATOR - SINGLE BAND

1*	OH3GD	14	84	168	26	4368
2*	G4GIR	14	34	66	20	1320
3	LA4YW	14	11	22	5	110



VK2BQQ computer keeps operating, while OM is taking a rest. "Karol's rig" finished second in the world on 7 MHz

OH1JT WORLD CHAMPION AT AGE 25

Martii Laine, OH2BH

Juha "John" Tuovinen, OH1JT/OH7JT, was first licensed in 1979 and stationed in his native North Karelia, some 400 miles northeast of Helsinki. Soon after he and his friends found contesting the best thing in amateur radio. The young group of OH7's became widely known for their high standards of operating.

John often scored among the top three in the domestic contest program, but it was only the lack of good hardware that kept him waiting for an impressive breakthrough into the international contesting. John and his group played an important role as operators of the world renowned winning multi-multi team at OHØW.

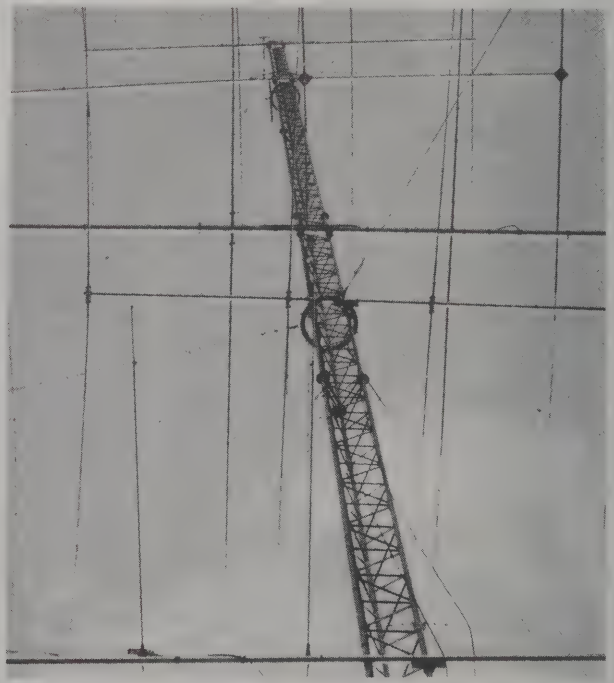
When he moved south to the town of Salo, John joined the other southern contest types and was selected as a member to the OH-DX-Ring (OH2AM/OHØAM) where he gained more experience. He soon discovered guest operating as a way of getting immediate results and within first twelve months, he had accumulated impressive scores to his credit: 2nd in Europe in all band CQ WW from OH2BH, 4th in the world on all band IARU, 4th in WAEDC and 2nd in all band SAC, all from OHØAM contest site in the Aland Islands. The final breakthrough came in the IRSA - WRC contest, with John, as OHØBH, winning the World CW Champion title.

OH1JT is technically highly capable and has contributed a lot to the success of the Aland Island contest site. John is works with equal ease on the massive towers, fixing the beams, as he is designing the controls and switching for a set of slopers on low bands.

During the WRC contest there was a share of problems: a 3-100Z blew up as a result of oscillations on 28 MHz. Fortunately there was a back up - a TL922, so he did not lose much time. (Rest periods in WRC come handy.)

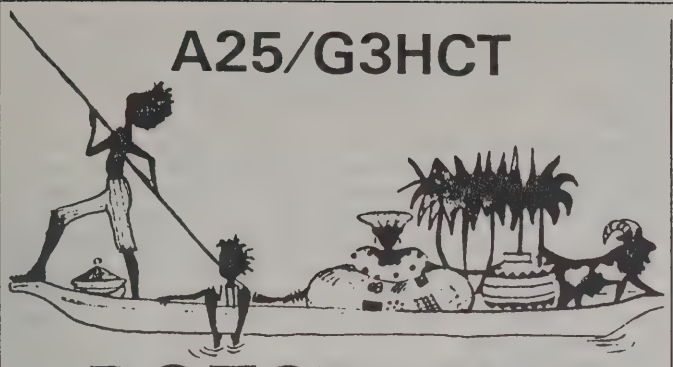
John is still single, working long hours as an electronic designer at MOBIRA - a mobile radio company in Salo.

We are all proud of having John at the top, representing the young Finnish generation at its best! (OH2BH)



One of two 120 ft rotatable towers at OHØBH, with stacked pair of old reliable Hy-Gain 204BAs on 14 MHz.

A25/G3HCT



BOTSWANA

John Bazley, G3HCT

We first visited Botswana in 1982 to see our son David who was working out there and at the same tome combine it with a visit to South Africa including, Ciskei, Transkei and Swaziland. That trip certainly made us determined to return to Botswana again and this time spend more time seeing the Country.

We originally planned to spend 4 weeks in Botswana travelling to the Kutse Game Reserve, the Okavango Delta, the Okavango Delta, the Chove, the Tsodillo Hills and then on to Victoria Falls. The other incentive (as if we needed one) was that our daughter Judy was now also working out there. We intended to be back in the U.K. on the Thursday prior to CQ Contest, just enough time to get acclimatized. Then our provisional flights schedule came through and we realized that we would have quite a long wait in Johannesburg for our connection at home. The alternative was to stay another five days and as a bonus operate during CQ. That decision was made fast...

During my last visit I had operated very briefly from A22AA, using my call A22CT which I had hoped to use again. A22 calls are now only issued to residents. Regarding equipment, I knew that an FT101E was available, also I knew through my regular skeds with A22AA that he would be returning to the U.K. about 10 days before the contest and that his 3 element Elan was available if I cared to collect it from Palapye (about 200 miles from Gaborone). That solved the Antenna position for 21/28 MHz. For the other bands I decided the easiest solution was to take along a Butternut HF6V, radials and spare coax. I also needed a good pair of headphones and an electronic keyer.

Jill and I then started to collect together all the 'bits and pieces' that David and Judy had asked us to take out. Then the shock - we were horrified to find that we had 52 kilo excess baggage without any Radio Equipment... Since we were now staying for 5 weeks we just could not reduce our own luggage any further. Yes, you've guessed. The radio bits and pieces had to stay behind except for two items rated 'High Priority' - headphones and keyer.

On our way South from Victoria Falls we called in at Lotsane School, Palapye, to see old friends and collect the antenna all neatly parcelled up for us and then back down to Gaborone. Thanks to David, and Judy's fiance Bruce, sections of steel water pipe appeared, were then welded together, the Antenna assembled and by Thursday evening, prior to the CQ test, the Yagi was up at 35 feet fixed on Europe. A major snag, to rotate the Antenna required 3 people to hold the guy ropes and move the whole assembly round <u>together</u>!!! So in the end I compromised with it fixed mid way between North America and Europe. With propagation mainly North/South it worked out well. Judy's breakfast area was commandeered as a shack (big advantage of fridge full of ice cold Cokes) and late Thursday afternoon we switched the rig on, it sounded fine. Quick CQ removed any doubts with a good European pile up. Yes we're in business.

In the next few days I would have given quite a lot to have had my TR7 with the 250 and 125 Hz filters and a separate V.F.O. Up early next morning to check what time the band opened up. I started calling CQ at 0515 and the first reply was BY4SK at 0545!!! Then East and Southern Europe with propagation slowly moving to the West. No G's yet. Back to the hotel for breakfast and then back Friday afternoon to catch the opening up to North America and at last - a 'G' - G3AAE. Reluctantly had to pull the switch having promised Jill to return to the hotel for a swim, shower and meet the family to go out for dinner.

CQ contest on the Band at 0515 no signals until RF3V at 0532 as the band opened up old familiar calls appeared, I lost count of the number of requests for skeds on other bands - the only other band available being 28 MHz. Surprisingly I worked several V3, PY, YV, and PJ but no W/VE and a total of 32 Europeans.

All other activity was confined to 21 MHz. The first in each district was - K1RX, K2TR, W3GV, W9IU/4, K5GO, W6YA, N7NM, W8TIV, K9QVB, NIØG, VE1QN, VE2AYU, VE3ST, VE4MP.

What was surprising was how clean all the signals were, distance seemed to have 'cleaned up', signals removing clicks, 'arms and legs' which we have become accustomed to hearing in Europe. Equally impressive was the discipline of North American operators which helped to clear pile ups and at 0545 only one JA in the log. No QSO with my brother VK6HD on which I had relied for VK and Zone 29. Remember it was a holiday and not a DXpedition it would have given me great pleasure to have been able to meet all the demands for other band operation on CW - perhaps next time.

It is said that Botswana is one of the last parts of unspoiled Africa. To Jill and I nothing has equalled sleeping under the stars in Kutse in the southern Kalahari listening to the animals calling. Our visit to Chiefs Island in the Okavango Delta. Stopping at Lloyds Camp adjacent to the Savuti Channel in the Chobe Game Reserve (it was only the pug marks in the sand outside our tent that Jill managed to convince us she had been woken up by lion rubbing against the ropes during the night)! With game drives early morning and evening to see, within a few feet, a pride of lions at a kill, to be that close to elephant and rhino. To the Tsodillo Hills to see the bushmen paintings and Bushmen Village. Will we go back? I think the answer must be yes - if David continues to work in Africa undoubtedly we will, but Judy is now making her home in Australia so I expect the next trip will be to VK4, but wherever it is next time, hopefully with antenna for all bands and a receiver with more selectivity. (G3HCT)

John A25/G3HCT was a welcome multiplier for many.

CHOOSING THE ANTENNA FOR LOW BANDS

John Devoldere, ON4UN

Antennas are really a technical issue. They should be approached scientifically, and not sentimentally. The antenna is not the best one because I use it. Neither because I "invented" it. However there always is a good solution to a given antenna problem. The problem is that there are limitations in just about every case. Limitations such as: real estate size, ground conductivity, neighborhood and surrounding objects, available money, desired performance etc.

DESIRED PERFORMANCE

Let us assume that the 80 meter DXer is after an antenna that will give him the best DX performance for the longest haul DX. I think it is reasonable to trade in some signal strength on a 2500 mile path if at the same time the system gets you a couple more decibels on a 10,000 mile path. It is also important to know if the user wants the transmit antenna to be the receiving antenna. If so, this is to be considered a limiting factor. Use of the separate receiving antennas is always an advantage, because the most important requirements for receiving and transmitting antennas are not the same.

Let me explain: efficiency is one of the first requirements for a transmitting antenna, you want all the RF to be radiated and not to be converted into heat. For a receiving antenna the efficiency can be a very secondary consideration. Loops and Beverage antennas are low efficiency antennas, but have a high degree of discrimination (directivity), which is an essential requirement for a good receiving antenna.

The issue on receive is signal to noise ratio. A receiving antenna system is adequate from an efficiency point of view as long as the atmospheric (plus man made) noise can be heard above the receiver internal noise. Atmospheric noise on 80 m is of such magnitude that present day receivers have a surplus sensitivity of about 20 dB. The rule of thumb is: the receiving antenna is sensitive enough (has enough efficiency) if atmospheric noise is substantially stronger than the receiver noise. (The noise on receive should drop when the antenna is disconnected from the receiver.) This is mostly the case with Beverage antennas which are typically 10 - 20 dB down versus a dipole at half wave height.

Another issue as far as performance is concerned is that the receiving antenna should match the transmitting antenna combined with transmitting power. We all know "alligator" situations: all mouth and no ears. Directivity in transmitting antennas will of course give you gain, but it means you always have to know the best signal launching direction, which is often different from the great circle direction. Omnidirectional transmitting antennas (vertical) do not require this.

AVAILABLE FUNDS

I guess this is the most important issue. Even on a moderate city size lot, very good performance can be achieved if you put up a 120 ft sky needle carrying a 3 element yagi. But that will set you back quite a few bucks. Maybe it's a better idea to spend that money to move out of the city into the country, where in any case you will suffer less from a man made noise and absorption from all kind of surrounding objects.

NEIGHBORHOOD AND SURROUNDING OBJECTS

If you live on quarter acre city size lot, don't ask me to tell you how to be as loud or hear as well as the big guns on a mountain top QTH or on a farm. It is just not possible. There simply is no general rule as to how to try to get the best out of given situation. Every case is different. It will be largely a question of trying and trying again.

If money is no limitation a KLM, or Create Design rotatable Yagi at 150 ft or better, is the answer. But I don't know of any cases where you can have this kind of tower on a city lot. I have one good friend who has a big TRI-EX sky needle and the KLM yagi, and he always keeps it nested down at about 27 ft during the day, when the elements barely clear the roof of the house. At night the needle rises in the sky, and produces a more than respectable signal.

Vertical antennas on small city size lot perform erratically or poor, depending on the absorption from surrounding objects and the ground system efficiency. Theoretically the best antenna is an antenna that does not rely heavily on ground reflections. That is a horizontally polarized antenna at least 140 ft high. I know this is not easy, but that's what it is. If you want to try a vertical in a dubious situation, make the ground system as good as possible. It is better to use a large number of short radials than just a few long ones. The use of galvanized chicken wire (2 ft wide) rolled out radially from under the antenna base works very well. N7CKD has been successful user of this approach on 160 m. Watch out for verticals in a city environment: they produce very strong ground wave signals and are ideal to get your RF into your neighbor's HI-FI, VCR or TV system.

You must have been wondering: what about the half sloper? It seems like there are as many success stories as there are failure stories. But it is certainly worth trying it. I have heard some quite good signals coming from half slopers. Delta loops can be good low angle radiators with the top at 70 to 90 ft and fed to produce a vertically polarized signal (fed 1/4 wave from the top apex).

Dipoles and Inverted Vees will not be terrific long haul performers unless they can be raised at least 150 ft above the electrical ground, which means they are out of the question in a typical city lot environment.

GROUND CONDUCTIVITY

If you are blessed to live in an area with excellent ground conductivity, you can consider using an antenna that requires a good ground, such as a vertical. If you are stuck with sand and rocks, stay away from verticals (if possible) and use a high (at least 140 ft) horizontally polarized antenna. It's as simple as that. The effective height of an antenna can be higher or lower than the physical height, because of terrain slope (and ground conductivity). That's why all those big guns are looking for when they buy a hill-top QTH. Usually the ground conductivity is poor to say the least on such hill-tops. But the effective antenna height can be quite startling. Often the reflection point of the signal will be in the "valley" where the ground conductivity is much better (ask W6LNZ when he beams long path to Europe).

The best signals from the US West Coast are produced here in Western Europe by such hill top locations (W6RJ, W6LNZ, AA6AA, W6RR, W7FU). Others produce quite respectable signals from hill-side locations with simple dipoles, but also get effective height enhancement due to the terrain slope (W6TSQ). If you are blessed to be living on a farm with good fertile soil or near a marsh, and you have enough room, a vertical supplemented with Beverage antennas, or a phased array of verticals is probably the best solution. Verticals require a good ground conductivity for the following reasons: Most important - to help collect the return currents of the antenna. This is where the ground system participates in the efficiency of the antenna. Typically it is the ground conductivity up to about half wavelength away from the antenna that affects the antenna

efficiency. What is not so well known is that the ground conductivity at distances up to 100 wavelengths away is important in determining the radiation angle of the antenna. Where a quarter wave vertical with a good return current ground system in a poor ground area typically produces a 30 degree wave angle, the same antenna in over excellent ground (or near salt water), produces a radiation angle which can be up to 10 degrees lower (20 deg). The advantage of a vertical complemented with Beverages or arrays of verticals over the rotatable Yagi system, is the fact that one can instantaneously switch directions, which is a very important asset, especially during the contest.

REAL ESTATE SIZE

Vertical antennas are generally not the solution for a small city lot. Verticals take more space than most horizontal antennas, because of the ground system requirements. In addition, it is best to keep a vertical at least a quarter wave away from any tall structure. A four square vertical array, using four quarter wave verticals, and which can perform as well as 3 or 4 element rotary at 170 feet, requires at least 1 acre of clear space (200 by 200 feet) to install a minimum ground system. That is much more than what is required for the horizontally polarized rotary antenna.

You did not find the answer to your antenna question? At least I hope I did not confuse you as to the real issues. No, I did not mention dipoles or inverted Vees at 70 feet. No, those are not what I would call DX antennas for 80 meters. Sure, they will work fine and bring you lot's of DX if you are willing to sit in the back seat, and if you are willing to miss the really tough ones. If you are only after working the mid-range DX (up to 400 miles), just about any antenna will perform satisfactorily, although not outstandingly. Dipoles and Inverted Vees have been modelled over different types of ground by several people, and the inverted Vee dipole is clearly a "poor man's dipole" but the trade off is not important. There is however nothing magic about the Inverted Vee performance, like some think.

Next time I will tell you more about vertical arrays and why we heard so few good working arrays in the past.

(ON4UN)

ON4UN LOW BAND DXing SOFTWARE

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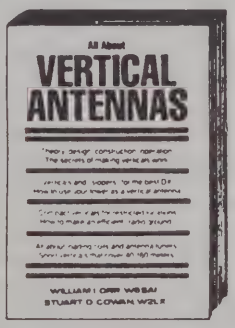

by Bill Orr, W6SAI and Stu Cowan, W2LX

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ANTENNAS

K7GCO

Ken "Judge" Glanzer

202 S. 124th, Seattle, WA 98168

In reply to ON4UN's comments:

I was sorry I missed ON4UN at the ARRL National Convention in San Diego as I wanted to hear him talk and swap a few ideas with him, but I was pleased to be able to fill in. I asked what the audience wanted to hear and then I gave them "my version."

Radio clubs and conventions are non-profit which I recognize, as it's difficult for them to pick up the tab for speakers from any distance. It does put a burden on the speaker for his time and expenses, but the staff who puts the show on, all donate their time also. Since about 1960 I've spoken at about 350 clubs and conventions and was only compensated 3 times (1%), I have never asked for any compensation and it's about par for the course. I guess this is the way I support my humble belief that "everyone is entitled to my opinion." Just once I'd like to be seated at the main table with the rest of the speakers and staff who donated their time. At the banquet I've never heard even once any thanks for the speakers. I spend a lot of time preparing and last year at Dayton I handed out 150 packets of 35 sheets of material free. Four hams came up to me at Dayton and said "you are one of the few antenna writers that doesn't BS in print."

Unfortunately there is a lot of nonsense in print. Remember "Faith and BS will always sell better than Facts and Truth." Or "If you have your choice of selling fresh or old BS--sell the fresh. It always sells much better." And "You can fool some of the people all the time and all the people some of the time and those are pretty good odds. (Old K7GCO Axioms.) There is more of this in the antenna field than probably any other. They will look you right in the eye and tell you great stories of how their antenna beats everything on the market. I have been a big fan and have had tremendous success with the Inverted V and sloper since I first used them starting in 1938 as a SWL on a Zenith floor radio. I have probably done more with them than anyone, but have only had one article on it in August 1960 QST. I believe it was the first published on the subject and several more followed. I first sent QST an article on it in 1946 and on the Sloper in 1947 and they never printed that. I've got several new variations that increase bandwidth and allow multiband operation without capacitors and have additional bandwidth.

Note! See my article on The History of The Inverted V and Sloper for more information on performance. (RADIOSPORTING Dec.86, p.16)

I've found that if mounted too low to the ground, "tilting" the Inverted V can improve its performance for certain distances in one direction. Making it a delta loop fed at the top is very effective and it increases bandwidth and the Z (have you ever tilted your vertical?). A fact that has had no description, is that they often work better under a 20 m beam. A 160 m Inverted V may need a 80 or 40 m beam on top for really good performance. I've found that large screens and or parallel radials spread out underneath out a ways are very useful. I've used several Inverted V variations that others have not, so my claims are based on different configurations and perhaps more complete data. You may also be aware that anyone who does a lot of research doesn't "tell everything" and they keep a few secrets to themselves to drive the competition nuts (those who say a certain antenna is no good). Further your evaluation techniques, requirements and biases will be different than someone else's. When I ask an opinion on an antenna I also ask what his "standards of evaluation" are.

I have completed an article also on trap verticals and it will show that I'm not a big fan of current fed verticals particularly on Seattle ground. My Inverted V's consistently beat the pants off of them here. However I am a big fan of voltage fed 1/2 waves and/or top loaded 1/2 (electrical) waves (1/4 physical) on 160, 80 & 40 m on Seattle ground. There is but 1 dB "line of sight" gain for a 1/2 wave over a 1/4 wave, but 3000+ miles out, this gain increases with distance I've found due to a sharper vertical pattern. The high current area is 1/4 wave higher and works into a different reflection factor giving a lower angle. I've found that small pattern improvements make bigger performance improvements on lower frequencies. I also feel that verticals on salt water (liquid copper) are untouchable - particularly vertical beams.

I always use multi-wire cage Inverted V's and frequently feed them with open wire line and a good tuner as it increases bandwidth and reduces RF losses which are higher than many are aware of. The W7DND vertical beams on salt water are well known around here.

On the contact with EL4A (now W7VCB) I was 40 over S9 on 20 m AM with 600 W with a Thunderbird tribander 35' high. I then called him on 40 m AM phone and was a steady 40 over 9 also with my cage open wire fed 40 m Inverted V. I think this is unusual signal strength except perhaps if some unusual band condition existed that night. I wasn't heard on a 1/4 wave Hy-Tower. I then called him on 75 m with the Hy Tower and was S9. I didn't have a 75 m Inverted V that night or I would have tried that also.

Over years I've noticed that many get different results with the same antennas as I have but current fed verticals have never been a good performer for me at my QTH here or on good ground in South Dakota compared to an Inverted V. I usually always have 2 or 3 antennas to compare at the same time and like to test with 100 W rather than 1 kW which tends to make almost any antenna work better and degrade the test. I know I have a good one when DX stations break me when I run 100 W and **that has never happened with a current fed vertical.** My conversions of Hy Tower as described in CQ Magazine article in 9/71 and the Top Loaded 10-90 degree vertical in 7/72 do a great job here on Seattle ground and why all the experts on verticals haven't found equal performance with designs like this is a bit puzzling.

There is virtually no feed point loss with voltage feed and no radials are needed or desired. Typical feed point currents are about .5A rather than 3-5A for 1 KW. That seems to be a concept that the current fed boys can't comprehend. They are very vocal with their objections to that concept even though many admitted to me they never used a voltage fed 1/2 wave vertical. If they have, they may have not had both types installed at the same time for comparison. The difference has been so great for me at times that you didn't need a 1/4 wave current fed vertical available for comparison. They seem to spend their time developing fancy band switching techniques for current fed verticals and this is well described in articles and books. This doesn't do a thing to correct the main problem of high reflection loss over ground which creates a null for 6 - 10 degrees on the horizon. This high reflection loss also reduces the potential 6 dB reflection gain over the free space pattern that it could have over perfect ground and almost does over salt water plus a major and sharper lobe right on the water. The angle is so low it scrapes up mist--RF Mist that is.

Good operators can make any antenna work better and I'm not a good DXer. I rely on "brut force" mostly (with low power). I have a friend that uses a unique zeroing in technique on CW that is possible only with the Signal One that he claims gives higher returns to his 250W calls.

I think that manufacturers of transceivers should give antenna information and operating techniques to their customers. With better antennas and techniques the customer advertises the manufacturer's rig with a better signal at the customer's cost and time.

I think I qualify my statements fairly well and they are based on fair comparison with other antennas at my location. I particularly enjoy beating some of the big DXers using my simple antennas. **"One Comparison Is Worth 1000 Claims."** (Another Old K7GCO Axiom) I'm working on a Backscatter system that will allow me to make antenna comparisons and tests without actually making a contact with a DX station. In the AM days you could actually rag chew with a DX station and make some antenna tests such as Front to Back ratio that you can't do now on SSB, particularly with low power. There is a very clever technique of getting a signal strength comparison with another station on CW that neither he or the other station know that it is being done.

I use all kinds of techniques and one on SSB has been very useful. If you switch antennas trying to see the difference on a pulsating SSB signal on an S meter, there has to be a fair difference. I have a technique where I can detect small difference on SSB signals. I wore out a heavy coax switch I made as a result of thousands of comparison over the years.

I will probably make more statements that ON4UN or others will object to. They are based on my findings at my location and the findings of others. My standards of evaluations are going to be different than yours and others and that's no BS. (K7GCO)

de VE3BMV:

Both of our great "anteneers" ON4UN and K7GCO are right! The big factor is the time and situation where the antenna is installed. From my own experience I can say that Inverted Vees, half slopers and loops at my VE3 residential location almost always outperformed my verticals with lousy radial system. I could observe at different times differences between the antenna performance. Even between the Inverted Vee and the loop. One night loop was better, another night Inverted Vee, yet another night even lousy (ground system) vertical. The VE3BMV contester's rule #73 says: "You can never have enough antennas for contesting." More antennas with various characteristics you have, the better you can take advantage of prevailing conditions. It means working the multiplier quickly and getting on with the rest of contesting. There are always times when even the "worst" antenna sometime shines. Properly phased verticals with good ground system are deadly for long haul.

What is the best antenna system? The one that can be adjusted to take advantage of momentary propagation mode, namely optimum angle of radiation on transmit and reception (not necessarily the same) and can reject unwanted signals and noise. (VE3BMV)

TS-940S Modification

IMPROVED DYNAMIC SELECTIVITY

John Devoldere, ON4UN

Years ago I was swearing by separate receiver and transmitter combination for serious DXing. This dates back to the days when the Drakè twins were top notch equipment. The early Japanese rice-boxes could not convince me at all. I simply could not hear any DX at all on a TS820 or an FT100 on the low bands. But things sure changed. I guess it's like with Japanese automobiles. My last three rigs have been a TS830, TS930 and now the TS940. I have heard that some people had bad luck with early 940's. I got mine from a well known distributor on the West Coast, and it was given a serious burn-in before I picked it up. It has worked flawlessly for over 15 months now. I made it totally different receiver however by installing the International Radio narrow filters (two 400 Hz filters for CW and two 2.1 kHz filters for SSB). (Check also K1EB classified ad in this issue. I have used his 455 kHz IF Collins 300 Hz filters and found them superior to any other filters, they have the lowest insertion loss, actually less than 2.1 kHz SSB filters. See RADIOSPORTING, Jan. 85, p.23 - VE3BMV).

Together with W3CV modification described in RADIOSPORTING May 86, p.31 and Dec. 86, p.18) this makes all the difference in the world. I still have the "old" TS930 with the original 2.7 kHz and 500 Hz Kenwood filters, and these filters really sound like wide open barn doors in comparison.

I measured the 2.1 kHz filters at about 2.0 kHz selectivity at -6 dB points with both SSB slope controls wide open. On my 930, with the original Kenwood filters, I measure 2.65 kHz. At -40 dB I measure a bandwidth of 2.25 kHz with narrow filters in the 940S and 3.3 kHz with Kenwood filters in 930S. At -60 db those filters become 4.1 and 2.6 kHz respectively. Similar improvements are obtained with the CW filters.

Probably the weakest point in many of the today transceivers using Phase Locked Loop VCO is the reciprocal mixing noise generated by the VCO. The VCO output noise (sidebands) is proportional to the bandwidth of the VCO loop. The VCO loop is the voltage line controlling the varicap which determines the exact frequency of the oscillator. A narrow bandwidth will result in a low noise output, but will also reduce the VCO response time (this means how fast the frequency can be changed). This is especially important when working split frequency with the "two" internal VFOs. Too low a response time would, in CW mode, show up as a chirping signal when working full break-in.

In the U.K. a modification has become popular whereby 2 RC filters are inserted in the VCO1 and VCO2 control voltage lines (pins 2 and 4 of connector 9 on the RF board). These very simple RC filters are shown in Fig.1. They can be built on a small piece of printed circuit board and inserted in the VC1 and VC2 lines right next to the connector.

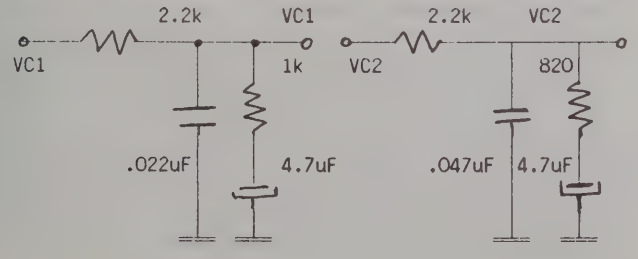

Fig.1 Filters for VC1 and VC2 lines.

The noise output of the VCO mixes with unwanted signal slightly off frequency from the wanted signal and produces unwanted IF signals that fall inside the passband of the IF filter. This action of reciprocal mixing is introducing off channel signals into the IF stage at levels proportional to the distance away from the wanted signal and significantly reduces the dynamic selectivity of the receiver. If the static selectivity (the IF filters itself) has a stop band attenuation of -80 dB, the noise in the local oscillator has to be down the same amount in the same bandwidth, in order not to degrade the effective (dynamic) selectivity of the receiver.

This described modification improved the reciprocal mixing by about 8 dB. The reciprocal mixing is measured as the level in dB above a wanted signal that an unwanted signal can attain at a specified frequency offset. (often 50 kHz), at a specified bandwidth (e.g. 2.7 kHz) to reduce the S/N ratio of the wanted signal by 3 dB. The standard way of expressing the reciprocal noise mixing products is to convert the values measured to dBc (dB carrier) or dBHz (dB at 1 Hz), which is the noise referred to a bandwidth of 1 Hz. The noise power in a 1 Hz bandwidth is 34.3 dB down from 2.7 kHz (34.3 = 10 log 2700). With the described modification the VCO noise output is improved from a figure of 127 to 135 dBc measured at 20 kHz offset. This means that in a 2.2 kHz (average bandwidth), the reciprocal mixing noise is 135 - 10 log2200 = 101.6 dB down from wanted signal. The figures may look confusing and this article is certainly not intended to go into further details as to the more technical aspects of reciprocal mixing.

But look at Fig.2, in which curve A shows the static selectivity of the first IF filter. Curve B shows the dynamic selectivity without the modification and Curve C shows the selectivity with the modification. The curves are for the International Radio narrow 2.1 kHz filters. Curve D shows the selectivity with the original filters and without VCO modification. Are you convinced now? If not, put two rigs side by side and listen during the contest when the band is really congested. The problems of reciprocal mixing, noise sidebands and many other technical performance criteria of receivers are covered in detail in my LOW BAND DXing book soon to be published by the ARRL. (ON4UN)

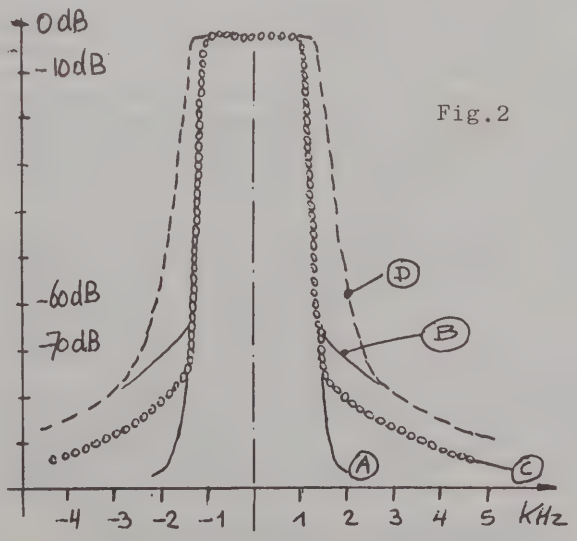

Fig.2

HAM RADIO AND BRAIN

WHY ARE GOOD HAMS SO SMART?

Yuri Blanarovich, VE3BMV

While on the plane between Toronto and New York, not having any ham magazines with me, I was "forced" to read American Way, the American Airlines magazine. Most of the articles written for those airplane magazines are written in very easy and popular form. One article caught my attention. It was called "Brain Aerobics," written by Dudley Lynch in the January 1, 1987 issue.

The under title was: "The brain is trainable, and many scientists believe the mind should be exercised as well as the body." Let me try to summarize the article, make some personal observations and then to draw some conclusions. Here is the digest of what the author writes:

Back in 1911 pioneering brain scientist Santiago Ramon y Cabal of Spain proposed cerebral exercises. Not until the 1970s, when researchers began to reveal the results of so-called longevity studies, did the value of mental gymnastics get much recognition. By the mid 80s, brain scientists had disproved most of the old assumptions about the brain's durability - or lack of it.

The belief that a vast numbers of brain cells die as people grow older was found not to be true.

The belief that senility is a natural part of growing old is not true. Senility indicates a disease (Alzhaimers disease?) - not a normal aging.

The belief that thinking skills automatically diminish as people approach their later years, not so. A healthy, stimulated brain continues to improve well into its 80s. Studies suggest that the normal, healthy, motivated brain continues to improve its abilities to make judgments and solve problems even past the standard retirement age of 65.

Prof. Diamond, who has done studies of Albert Einstein's brain says: "We've been too negative in how we view the human brain."

The author goes on presenting some suggestions made by the brain experts:

Practice foretelling the future. The broader the time-processing horizons of your brain, the more effective you are in society today, particularly in the world of business.

Join up. Without company - lots of it - the brain begins to shut down. Make friends now, it's not so easy after you retire.

Go into action. Be a pursuer. Each time you participate, you tone those middle-of-the-brain limbic tissues most acutely concerned with a sense of the immediate, with what's happening now. These are survival skills. Humans feel pleasure when they use those skills successfully.

Take charge experimentally - at any time, in any place - of your memory pool. You can use the imaging abilities of the brain to take any experience out of your memory and do beneficial things to it. Out of such activity comes a heightened sense of control, of self-awareness.

Practice being aware of inner sensations and outer perceptions you usually ignore. Apparently the brain is not a user friendly system. Like the highly complex computer, it does only what is told. One valuable instruction can be to notice the inner stimuli the brain has been ignoring. Some experts call it intuition.

Maintain a good exercise balance. An overexercised brain feels anxious and fatigued. An underexercised brain is bored. Best of all is a brain whose owner is able to achieve matching the capabilities of the brain with its challenges.

Keep learning, always. By getting involved with hobbies, exploration, adventures, you can enjoy the expectation of an "evergreen" brain. Experts assure us that we can keep adding to our mental repertoire well past the onset of old age. There is no question that old dogs can learn new tricks.

Much of the new thinking about brain aerobics says that it isn't brains that age; it is attitudes. A busy, changing, well-motivated brain is usually a healthy brain.

Author Han Suyin, 69, says it well: "If tomorrow you prove to me something new, I'll be quite willing to overturn my ideas because ideas are made to be overturned."

While reading this article I realized that our hobby is a great brain exerciser. All those years of learning, experimenting, accomplishing and feeling satisfied are not wasted. The result of this exercising can be felt in one's everyday life, at the workplace and in the community.

Experts say that up to the age of about 14, the human character is formed. Some children have a "jump" on their peers by having a biologically better "built" brain. This could be in some specific areas or skills (relates to certain parts of brain). Often we see children from the same parents, growing up in the same environment, being quite different.
Now this foundation is important, but not always a guarantee that someone would be a "genius." Brain's capacity can be significantly enhanced by exercise-activity and loading the memory with data. Children that are exposed to variety of different activities stimulate and exercise different parts of brain-better balance. (This is why we "torture" our kids with activities such as sports, music, dancing, languages, reading, etc.) It appears that young children can learn faster than us "old goats." Those who learn to play an instrument, sport, or morse code in their teens, will have a better foundation or a jump on those who start doing it later in their years. I bet that the most successful contesters started their operating when they were about 16 to 20 years old.

It is important to develop or exercise the brain in different ways: vision, hearing, music, movements, thinking - combinational skills, talking, reaction, memory. The more we do of that, the better overall conditioning and "shape" the brain is in. One doesn't have to worry about running out of memory space or saturating the brain. Scientists are telling us that we are still using only a small fraction of brain's capacity. We might not be able to recall something instantaneously, but it is not lost, it will come back at another time. Old people can recall things from their young years, which in the mean time they forgot. In their late years, those things are coming back with amazing details.

The brain uses the conscious and subconscious mind. While the conscious mind can be taught by reading, memorizing, studying, the unconscious mind can be "taught" only by doing things, repetition. For example riding a bike, swimming, sending a Morse code. There is no short cut or cheating here. If we want to master it, it can only be done with practice. Once acquired, this skill stays with us. If not used frequently, it might get a bit rusty, but with a little bit of exercise it comes back fast.

More knowledge and more activity, both mental and physical produces a better conditioned and alert brain. This kind of brain can produce a better solution to a problem or when exposed to the crisis. Sometimes we do not exactly know why we do it, but later it turns out that there was a reason for it. The subconscious part gives us "intuition" without us even noticing it. As we grow older, this "library" of subconscious knowledge and skills is silently accessed by our background processor in the brain.

So how do the hams fare in the development of a good and healthy brain? I think we are fortunate to have this hobby. At least those who take it seriously, especially the contesters, learn and exercise as many areas of our activities as possible. Those who cheat on the exams, buy a radio and then just do their "DXing" on the lists and nets, don't have much to learn except obedience to their list "undertaker."

A good, successful contester has to learn: high speed morse code, fast and clear speaking, acquire coordination in tuning the radio and operating all the controls in the shack (movements), and know the propagation. He must also understand or design antennas, understand and design or modify the equipment, train in endurance to operate with a limited amount of sleep, develop ability to filter and extract signals from unwanted crud on the band, develop a sensitive hearing, stay sharp and alert, write, talk and tune at the same time and stay cool. As I mentioned before, some of those skills can be acquired by learning, but most of them only by doing it - charging up the subconscious mind. If anyone thinks that he can just get the biggest antennas, best radio equipment, not read the RADIOSPORTING, enter the contest and win at the first try, he is dreaming. It is the same as someone thinking that if he bought a Stradivarius violin and a book of musical scores, he could become a concert violinist.

The abilities that contesters and DXers develop can be amazing. How many times did we have someone in the shack listening to the radio, saying that he can't hear the station we are copying? At one time I even had a tape recorder going only to find out that while I copied the stations call 100 percent, there was no signal audible on the tape! The combination of a trained ear and brain is just amazing. Some contesters can copy two or three calls at the same time and answer them in one shot.

All in all, amateur radio and contesting in particular can be beneficial to the conditioning and development of the brain. It exercises various areas, exposes one to a wide range of topics and areas of knowledge, teaches one to be practical and inventive. This sure can be a big asset for us in our professional life. This pool of acquired knowledge expands the horizons and modulates one's thinking. Seemingly "suffering" through all that "bad learning" can really pay off. We have had numerous examples of premiere contesters achieving a remarkable heights in their professional or business life.

There is another question as far as the effect of RF on Brain and the nervous system goes. One fact is known: humans exposed to higher levels of RF radiation become aggravated, prone to arguing and aggressive. Also there is a possibility of a negative effect on pregnant women. But there could also be a positive effect of "moderate" levels of RF on the developments and workings of the brain. "She" is the computer that works with electrical pulses. The electromagnetic waves can interact with this mechanism. There is a known effect of healing broken bones and sore muscles by applying an electric current or a magnetic field across the problem area. Maybe those hot shot contesters are using the RF as fertilizer for the brain?

One has to be careful not to push the brain too far. Lack of sleep, can "shift" the brain into a different gear. As a result the subconscious part could take over without our realization. It happened to me in the contest twice. I started blabbing nonsense into the microphone without knowing it. When I get really tired, I sometimes write the number 5 instead of the letter B in the callsign. Must be defective memory location where I keep my alphabet. Another operator kept calling CQ contest. Stations were calling him, but he just kept calling CQ, it just went by him. Interrogators use the sleep deprivation technique to break or trick their subjects into saying things they don't want to. Try to get sufficient rest, so the brain will less likely shift into the weird gear.

Scientists are finding that there is a connection between the brain activities, physical health and healing. Once I was able to "get sick" and to have a fever by intensively thinking about it. Some people can stop bleeding by thoughts. People that live longer are usually those who are still active past their "retirement age." The brain and the body are linked very closely.

So don't listen to Wayne Green telling you that you should get your ham radio license without exams, morse code and that one day we will all be talking via RS232 at 9600 baud and the CW will be dead. Learning is good for you, for your brain, family and country. Get your mind wide open and let it sponge up all the knowledge it can. This "instant society" living off welfare, in front of the TV tube, eating hamburgers and drinking Bud Light, will need someone to fix their TV set, when it breaks down. They will come to you. You will be one of the few with any brains left that can do the job. You have to KNOW the stuff in order to be useful - to design, service, and use it properly. Politicians can BS, but engineers, technicians can't. You either know what you are doing, or not. If you do, then you will be ahead of the pack and life will be easier for you. With the explosion of computers, automation, and communication technology, there is a demand for people with brains. Those who adapt to the changes faster will get ahead. So all that "suffering" while mastering your contesting skills is not only beneficial to get satisfaction from your hobby, but it has a direct impact on your professional life.

People with good brains, loaded with information, possessing great thinking and combinational things have a difficult time to live and be understood by their less "smart" peers. We can say that they are ahead of their time, they can see further into the future, they can foresee some developments. Others quite often can't even comprehend that. Great people with great minds are usually appreciated or admired later, quite often long after they are gone.

Knowledge is the greatest treasure we can have. As the great Ukrainian poet Taras Shevchenko said: "Learn my child, knowledge will be yours. Fire will not burn it, water will not take it away."

Have you noticed how much easier it is to deal with the intelligent, educated person than with "fool?" Isn't that the problem with the world today? There are too many fools around, some of them in pretty high places.

So, ham radio and contesting can be very good for your brain and your professional development. This is of course only if you work at it, exercise the brain and not just sit and wait your turn on a list to work that new DX country. Brain needs a challenge. See you in the contests! (VE3BMV)

THE COMPETITIVE SMALL STATION

EXPERIMENTING WITH ANTENNA

Paula Franke WB9TBU

PO Box 873, Beecher, IL 60401

My personal assignment to while away the winter hours was to study up on antenna theory and propagation. These are two subjects to which I never paid much attention, just enough to pass the exams, no more no less.

I've been involved with the hobby for 11 years and was content to just muddle my way through, making the occasional DX contact and ragchew in between contests. But, after a while, I began to feel like things were stagnating. I actually went for two years without even turning on the radio except for a couple of contests.

Well!! One day I got to thinking, why did I go to all the time, trouble and effort to get licensed and assemble a station of modest, yet decent, proportions if the equipment was going to just gather dust. (Sometime ask me about the family of mice that set up housekeeping in my old HW-16.) I began to realize that something was missing. That "something" was an intangible sort of thing. For any hobby to remain interesting, one must have some sort of goal or set of goals. That's what was missing.

When you're a "small" station, it's very easy to feel overwhelmed by it all. In a contest you feel as though you're relegated to picking up the crumbs. In DXing or just plain communicating you tend to feel run-over by the big guns.

When my own situation got to this point, I knew it was time to sit down and take stock of the situation. While my station did manage to get a signal on the air, it was obvious that some improvements should be possible. Financial constraints prevented a bigger and better rig and/or tower with super-deluxe antenna (neither of which would necessarily guarantee any major improvement.) So I began to investigate other possibilities and thereby lies the reasoning behind my winter "scholarly" activities.

The first improvement was in the antenna department. In November, Pete KB2OR wrote to me about a great horizontal loop antenna that he had just put up and was having marvelous luck with it. I put together a quickie version of it and had it up in the air (a staggering 20 feet!) in less than an hour. It was like the difference between night and day. You've heard the old saying "You can't work 'em if you don't hear 'em"; well, I never realized what I wasn't hearing before! So, while the weather outside is still not so great, I'm spending my free time studying the antenna books to see what can be done to make the system even more efficient. Several other hams have put up this same antenna. We'll be comparing notes and prepare a future article about it.

Propagation is something that is beyond the control of the best of us. To me, it had always seemed to be an almost alchemic science. Forecasts and predictions were just mystical mumbo - jumbo. All I knew was that lots of sunspots was good and the reverse wasn't. However, I've learned that we don't have to be totally at the mercies of the forces of nature.

Bob Brown, NM7M writes a Propagation & DX column for the QRP ARCI QUARTERLY journal. I still don't know even a small fraction of all there is to know, but Bob's columns have done quite a bit to further my understanding of the meaning of the numbers given by WWV at 18 minutes past the hour, as well as what factors influence these numbers and how they in turn affect our signals. By keeping track of the numbers for solar flux and A index and plotting them together on a chart, I can get a pretty good idea of what sort of general conditions I have to look forward to.

One thing I've learned though is that 'bad numbers' don't necessarily mean that nothing is happening. The smaller station just has to work a little harder and dig a little deeper. February and March have been particularly difficult months in terms of propagation but I've still managed, using 5 watts or less, to log several new countries:XF4, CT, CT2, CT3, PZ, EA6, and LU/Z. Also (and probably most important), now I can tell if my problems are due to propagation or the antenna falling down again!

SEE YOU AT DAYTON

It's Dayton Hamvention time once again. For most attendees, the Hamvention starts on Friday April 24. But for the QRPer, things begin happening a day sooner. A rumor that I've heard says that the QRPers have almost completely taken over the Belton Inn in downtown Dayton. My latest information (courtesy Jim, W1FMR) on what's happening is as follows:

Thursday: Noon to 5pm - the 10th floor hospitality suite will be open with a show and tell of homebrew projects.
5pm to midnight - forums on homebrewing and antennas will be conducted
Friday: 6:30 to 8:30pm - QRP dinner
8:30 to 9pm - QRP awards, conducted by Fred Turpin, K6MDJ
9 to midnight - members of the GQRP will talk on activities across the pond.
Saturday: 11:15am - QRP Forum at the Hara Arena
4:30 to 6:30pm - closed ARCI board meeting.
6:30 to 8pm - beer and pizza party
8:30 to 9:30pm - general meeting
Sunday: hospitality suite closes at noon.
4 pm to dawn - MQRP and GQRP will make plans for the next convention.

From all early indications, Dayton will be a real QRP event. There will be a QRP information booth in the Arena. In addition, Chris Page G4BUE will be bringing along a group from England to operate a GQRP booth, giving the Americans some competition!

If you're planning on attending Dayton this year, I hope you'll be able to fit some of the QRP activities into your schedule. Even if you're not a die-hard QRPer, even if you're not a QRPer at all (yet!), drop by for some fun and interesting conversation.

If you can't get to Dayton, listen for the group operating the low bands during the convention. Many of the folks will be bringing their rigs and will be operating from hotel rooms. So if we won't be able to see you, maybe we'll at least be able to chat. (WB9TBU)

QRP NOTEBOOK

Review by C.F. Rockey W9SCH

After a nail-biting waiting period, Doug DeMaw's QRP NOTEBOOK has now burst upon the radio amateur's skyline; it has been worth the wait. NOTEBOOK exemplifies the clean and accurate typography that has become characteristic of ARRL publications. Its appearance is pleasantly plainer than most of the League's books, there are no excess photos or frills. This is good and certainly more appropriate to QRP and the times.

DeMaw's engineering background and his 35 years of QRP experience are amply reflected in the wide coverage of QRP that NOTEBOOK provides. Its introduction, six chapters and two appendices effectively include everything from a general introduction to QRP and recommended

antennas through a brief description of most of the QRP societies of the English-speaking world (including our own MQRP). The main thrust of NOTEBOOK is technical and correctly identifies the home construction of apparatus as the very heart of QRP.

The book resembles its sister publication, the ARRL ELECTRONICS DATA BOOK, in that it largely extracts and classifies the individual circuit blocks used in QRP equipment, such as product-detectors, amplifiers, filters and oscillators. It then presents at least two examples of each category in schematic diagram form. This is a most helpful feature since many constructors do not exactly duplicate a described project but rather pick and choose between the features of several to make their own synthesis. W1FB's book easily facilitates such delightful 'idea-stealing' and this is much appreciated.

However, it does not mean that NOTEBOOK doesn't include complete projects, it does. There are receivers, transmitters, transceivers, antenna tuners, SWR indicators and pieces of test equipment. There is a frequency marker, a ladder type power attenuator, a RIT modification, a side tone generator and an RF power meter.

The "QRP Workshop" tells you how to do it and the "QRP Operating" chapter tells you what to do with it. The book's circuit diagrams and drawings are clearly-done, well-labeled and complete.

NOTEBOOK does have a couple of limitations. The yet useful QRP/vacuum tube art is not mentioned; this would be useful to the many amateurs who have sizeable stocks of "tube-type-gear" and would like to use it. Additionally, the book's listing of new parts suppliers is helpful but some advice on the acquisition and use of salvaged components would help lower the cost of home built QRP gear and thus widen interest in this activity.

QRP NOTEBOOK is much more than a project description book, it is a useful and valuable reference work of interest to any amateur. It is 81 pages, 8" x 11-1/2", soft-covered and is published by and is available from the ARRL, 225 Main Street, Newington, CT 06111. Cover price $5. (Reprinted by permission of author from the June 1986 quarterly issue of the Michigan QRP Club's journal THE FIVE WATTER.)

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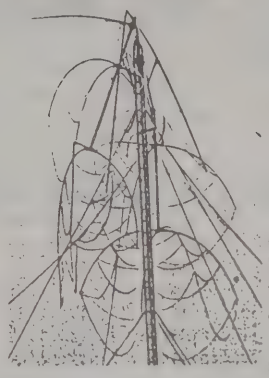

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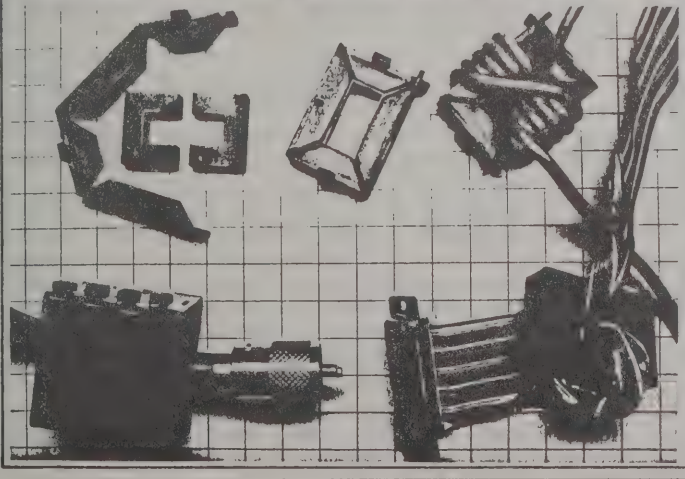

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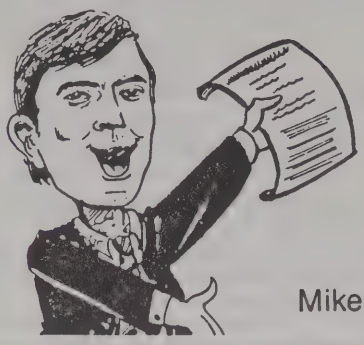


TECH NEWS

Mike Spenuk, VE3JTQ

Sunspot Cycle is 22 Years Long!

At a meeting of the American Astronomical Society in Pasadena, California this past January, a new view of the solar cycle emerged. Scientists now believe that the familiar 11-year period is within the real "cycle" which may be as long as 22 years.

Current data indicates that massive convective currents starting at the poles push the Sun's magnetic fields around. The intensity of the currents increase towards the equator and create regions of intense magnetic fields--sunspots which flare up with an apparent 11 year cycle. Geological records in South Australia indicate that the cycle has been occurring for almost 700 million years (Scientific American, August 1986, p. 88). From the geological record, the cycles range from 8 to 16 with an average of 12 years.

But "what we thought was the solar cycle--the 11 year period of sunspot activity from minimum to maximum and back--is really the tail ends of the cycle," Herschel Snodgrass, a physicist from Lewis and Clark College in Portland, Oregon, told the meeting. "When one cycle begins near the poles, another cycle is in progress at lower latitudes," Snodgrass said. "The two cycles overlap."

Other scientists concur that the cycles begin at the poles every approximately 11 years, but do not agree as to their length. Richard Altrock, a solar astronomer from the US Air Force Geophysics Laboratory, says the cycles are about 17 to 19 years long. Peter Wilson from the Department of Applied Mathematics at the University of Sydney says the cycles run about 22 years. Wilson also states that the scientists "have been unhappy with the old model for some time."

While working at the National Solar Observatory at Sacramento Peak, New Mexico, Altrock discovered emission peaks of ionized iron at solar latitudes as high as 70 to 80 degrees in the corona around the sun. The peaks could be tracked steadily towards the equator at a rate of about 3 degrees a year, and eventually merged with sunspots.

Recent conclusions made about the data collected suggest that torsional oscillations by bands of gas moving faster and slower than the average rotational rate of the sun may be the key to understanding the solar cycle. These convective flows are similar to our wind patterns on the earth, only move about an azimuthal axis and migrate towards the equator. The bands of gas surround the sun like toroids, four in each hemisphere and adjacent toroids turn in opposite directions. There is also an indication that North-South flows also exist.

It will take some time for the rest of the researchers to review their studies of the solar cycles, but a whole new theory on the sunspot cycle may arise. (New Scientist)

Law catches up with car phones

Recent changes to the Highway Code in Britain could expose motorists who make phone calls on mobile telephones while driving to prosecution. The new Highway Code, which was published in February, tells drivers not to use a hand-held telephone while driving, except in an emergency, and not to pull over onto the hard shoulder on motorways to make calls--even in emergencies.

Previously motorists were not forbidden from using radio telephones while on the move. But the change in law is impractical because, technically, it will prevent lone constables driving police cars from making or taking calls on the road. Up until now, the police could prosecute users of radio telephones for what they judged to be driving with undue care and attention, but the police and the courts sought guidance on the matter from the Highway Code. The previous edition lacked this guidance, so prosecution for careless driving while phoning were rare. Cellnet and Racal Vodafone, the two cellular network systems in Britain, and each with about 60,000 customers, know of only two cases that have reached the courts; only one successfully prosecuted.

A survey conducted by Gallup claims that many of the 120,000 people who use cellular radio telephones in Britain can gain an extra working day every week by making and taking calls on the move.

Though users now face greater risks of prosecution the companies that make cellular phones are not worried by the news. This is because the new guidance in the Highway Code allows motorists to talk through portable radio telephones that are not held in the hand.

Drivers talk through microphones attached to the visor. Hands-free cellular telephones of this type cost about $250 more than hand-held models. Peter Wallis, Cellnet's marketing director, says that 40% of the Cellnet car phones now sold allow hands-free operation. (New Scientist)

Bandwidth Breakthrough

AT&T Bell Laboratories in New Jersey have demonstrated the first system to transmit a communications satellite's full microwave bandwidth through optical fibre for a long distance without reamplification. The Bell researchers sent the 500 MHz bandwidth of a standard satellite C-band (5 GHz) transmission through more than 20 km of fibre with minimal signal degradation.

It is expected that continued research will make it more economical to locate earth station antennas far from a user's terminal equipment, link a user's site to a back-up antenna which decreases the chance of outages from atmospheric disturbances, and allow fibre optic cables to carry microwave signals from an antenna array to a shared computer which is applicable in radio astronomy. As well, this technique could be used in terrestrial microwave systems and for use in the Ku-band (40 GHz) where higher atmospheric loss often requires backup dishes to be used.

Coaxial cable is generally used to carry microwave signals at the earth station. However, power losses from the cables are too high to send full bandwidth beyond tens of meters without reamplification. As a result, satellite dishes have to be located near terminal equipment or the signal has to be split up into segments and sent through several parallel cables. (Canadian Electronics Engineering)

Quality of speech ride 8 kB/s channel

Researchers have developed a system for multichannel communications that provides real-time voice compression using only about 8 kHz of bandwidth. Gee! No, GTE laboratories, Waltham, Mass. have become the leaders in the "cram all you can down the standard telephone channel" race.

"According the GTE corp., by combining a coding algorithm based on an adaptive subband excited transform

(ASET) and time-domain harmonic scaling (TDHS) high quality speech compression at 8.5 kB/s can be achieved. GTE emphasizes that the quality of its system has been verified by formal testing." The most difficult task in developing the high quality ASET algorithm was finding a satisfactory way to reduce framing noise which is created when coded speech is quantized. The usual method to limit noise is to improve coding within each sample. GTE's new approach smooths the transition between coding frames. Each neighboring frame is overlapped and trapezoidal rather than square framing is used. (Electronics)

FCC stalls satellite mobile radio service

The FCC has decided against allocating any of the heavily used 800 MHz band to the Mobile Satellite Service and has assigned the service instead to the less desirable L-band (1.2 GHz), which is already allocated internationally for the aeronautical mobile satellite service, and allotted the available UHF frequencies to metropolitan public-safety agencies which have lobbied--with strong support from Motorola, Inc.--for them.

The FCC has decided to allocate 6 MHz of the 800 MHz band for terrestrial two-way radios for police, fire departments, and ambulance services. The Associated Public-Safety Communications Officers, Inc. considers the decision a great victory for public safety forces as it will allow for additional channel space without the need to buy new radio gear.

Generally, the MSS operators are disappointed by the decision. According to one company's representative, "...$50 Million has been spent in the U.S. and Canada in developing the plans and technology for [the MSS] service in UHF." According to some MSS operators, this decision will delay the implementation of the MSS and prevent the needed communications capability for public-safety and private customers operating outside metropolitan areas. An estimated annual market of over $1 Billion.

As well as disappointing the 12 potential MSS operators, this decision creates a conflict with Canadian operators who have an agreement with the commission which dates back to 1982 to establish the MSS in the 800 MHz band. Under the 1979 WARC agreements, portions of the 800 MHz band can be used for the MSS. Canada wishes to continue development of an 800 MHz MSS, but is tied to the FCC's decision since the MSS operation would generate interference to the U.S. terrestrial operations. However, the FCC placed 4 MHz of the 800 MHz band on reserve pending new negotiations with Canada.

Further, by moving the MSS to L-band, the international avionics community has also become upset with the FCC's decision. The IAC believes that by 2010 it will require all of the 28 MHz L-band allocation for its operations. The International Civil Aviation Organization firmly opposes any sharing of L-band frequencies. (Electronics)

Bids for largest undersea cable system

Bidding has opened on the world's largest undersea cable system. Australia's Prime Minister Bob Hawke called on Australian industry to enter the competition for the $656 Million U.S., 20,000 mile fibre optic system. When it enters service in 1991, it will be the region's first laser-powered fibre optic system.

The project is part of the TASMAN-2 fibre optic cable system, with an initial 2,000 mile link to New Zealand. Cabling is expected to reach North America by 1993, and an Asian link is planned for 1995. Australia is expected to use 50 times its current international communication system capacity by the year 2000, according to Hawke.

Hawke's announcement comes just two months after Australia announced a new $300 Million undersea cable link to Indonesia and Singapore--with through links to the Middle East and Europe. The cable terminates at the new $180 Million, government-owned International Telecommunication center in Perth, which is the only communications complex in the world to have cable, satellite, and high-frequency radio facilities operating from the same location.

Founded in 1947, the OTC, operating undersea cable and satellite connections, is the country's communications link with six other continents. The OTC sits on the governing board of INTELSAT, the 112-nation consortium based in Washington, D.C. and is also part owner of the International Maritime Satellite Organization. (Laser Focus/Electro-optics)

Webster's Second Law of Physics

"Amateur students of Quantum mechanics may be interested to hear of Webster's second law of physics, or the "Theory of Non-conservation of Socks in Washing Machines", formulated during my student years. It goes like this:

"'There is a finite probability that a sock, placed in a washing machine, may spontaneously decay into a handkerchief and a bit of fluff. If the initial sock has enough mass, it may decay into a sock-antisock pair, plus the hanky and a bit of fluff. This may lead to a bound system, 'sockonium', which is relatively stable against annihilation', This might explain the observation that on removing your washing from the machine, not only have you lost one of your thick woolly socks, but you appear to have washed a pair of someone else's socks as well.

"Accurate measurements are hard to achieve. This is a consequence of the Uncertainty Principle--if you count your socks before putting them in the washing machine, the act of counting makes the socks' wave functions incoherent, so any subsequent measurement of the system's Sock Number will yield the previous result.

"As it stands, Webster's Second Law is totally empirical. Perhaps someone would like to provide the theory to back up this familiar phenomenon? Send your theses to anyone but me. Simon Webster, Hemel Hempstead, Herts."

(New Scientist)

Operators from the ice cold Heard Island to hot Saudi Arabia, they all converge in Dayton's hospitality suites L.to R. DXpeditioner Jim Smith, VK9NS, Bob Walsh, WB8MOA, HZ1AB, and Kirsti, VK9NL

Propagating Waves

Yuri Blanarovich, VE3BMV/W2

We received some very interesting letters from K3ZO and VE7BS in response to the reprint of my article on Conductive Radio Wave Propagation Theory that appeared originally in the June 1980 CQ Magazine.

Fred Laun, K3ZO

I was delighted to get the very interesting December issue of RADIOSPORTING and find that you are now set up at the new QTH. No more phone operation below 7100 on 40 meters, though!

Thanks for reprinting your 1980 CQ article on propagation. I was moving about that time and missed it the first time around. Of course you're right about how science clings to it's old theories and tries to make the facts fit the theory rather than the other way around. That's also why "holes" are required to move in semiconductors rather than electrons.

As far as propagation is concerned, if it's already well-known that radio signals can duct in the atmosphere (witness the QSOs between Hawaii and W6 on 2 meters) then why can't signals also duct in the ionosphere? I'm quite sure they do. You also do have earth reflection, however. The O-T-H radar systems (woodpecker, etc.) are based on that and have been worked out according to quite precise calculations. So I think we can say with a fair amount of certainty that both earth reflection and ionospheric ducting exist on all lengthy propagation paths in the HF and VHF bands.

A few other observations that I have made based on having operated over a long period from various parts of the world.

1) In some respects, conditions are better on 40 and 80 meters during the high sunspot years than they are during the low part of the path due to the MUF's drop below the band, and on 40 meters there is no halt in the European opening during the mid-evening hours on the U.S. East Coast.

2) When the late Don Riebhoff (K7ZZ and CT4AT) and I were in Thailand in 1969, we were located about 150 miles apart. I had a ground plane mounted on a water tower with a metal roof, and he had a 4-el quad. As he spun his antenna on 10 meters while I listened (on a dead band) we found certain directions where there were multiple echoes. (This was during the early evening hours). The most frequent echoes were more than five distinct echoes at the same time. Incidentally, I was located west of him.

3) When I was at HI8XAL in the mid-60's, I had a 4-el quad on 10 meters and a 2000 foot long wire permanently connected to a Collins R-390 receiver. The R-390 was immune to overload so I could hear my back scatter echoes as I turned the beam. If the band appeared dead, I first rotated the quad while listening for echoes. If I heard any, I peaked up the beam for max. echo strength, called CQ, and was almost always rewarded with an answer. best backscatter was usually near south.

4) On 40 and 20 meters, you can easily get the beam too high for best results. Like you say, stacks are great antennas to have since you can learn a lot about propagation. I have had a Telrex 3-el yagi on 40 meters (the 46-foot boom model) for almost 10 years now at my home QTH in Maryland. The antenna is at 91 feet, and I have never felt that I had to take a back seat to anyone on the band, no matter how high their antenna, even twice as high as mine. N4AR will beat me now and then, but I will beat him now and then, and so it goes with others.

I can remember an ARRL contest in 1978 when I was in the low-band phone category they had at the time. I worked UK9AAN (now UZ9AYA) a few minutes into the contest and then about an hour later they called again. When I pointed out that we had already worked, they said they knew, but that they had been calling W2PV and W4BVV for several minutes without success, and wondered whether they were still getting out. Of course every three years or so you do have to take the antenna apart and re-lubricate the joints. On 20 meters, for the last couple of years I have had a Telrex 6-el at 150 feet and on another tower the W6PU 4-el quad (2 elements driven out of phase) at 75 feet. The high antenna is always better to Southern South America after dark. Outside of that, the lower antenna is always better on any path, long or short, except on some skewed paths (Southeast Asia over Europe during hours of darkness) or during times of very high absorbtion, K index of 5 or more, when the high antenna is marginally better, the low antenna shows as much as 20 to 30 dB advantage over the high antenna.

5) The W6PU antenna, by the way, is a real performer. How much more could be done with such an antenna if, in addition to developing a precise phase relationship between two elements, you could also work with power splitting and other beam-forming techniques. It has always surprised me that, while stations on the standard broadcast band have been using such techniques for many years in order to generate very precise coverage and null patterns, so little has been done in that respect with amateur antennas. Maybe when I retire....

6) Having an 80-meter rotary now, I have been fascinated by how frequently skewed paths exits on that band. It is quite common for Europe to peak at 75 degrees early in the opening. During the first couple hours of an ionospheric disturbance, this is especially true on signals from UL7, UH8, etc, which are actually enhanced at such a time, and peak up from 90 - 100 degrees. In the morning, the JAs are usually peaking southwest before daylight, but the minute daybreak hits, they immediately switch to short path.

7) Working the antipode is always interesting. Of course, the antipode from the U.S. East Coast is about 1000 miles west of VK6 in the Indian Ocean, so we don't observe as much antipodal skip. But when working the antipode, "every path is short path," so to speak,and from Maryland VK6's can often be worked over the North Pole when 9M2's, 9V1's, etc. are loud. In HS, the antipode is 0A4, and when there is a SID and subsequent blackout, the only signals that can be heard on any band are 0A4's.

When I was at LU5HFI, the antipode was in BY-land but not all that far from JA, and JA's would come in at almost any part of the day or night on one band or another, and though southeast and northwest were the usual directions, they could show up at any direction given certain conditions.

8) Speaking of LU, does the fact that the LU's seem to own 10 meters, when someone else is coming in, have anything to do with the fact that, for unknown reasons, the atmosphere is about 10,000 feet thicker over LU than it is anywhere else in the world? When I was in LU two-meter repeaters didn't exist, but now that they have a lot of them, my friends there tell me that working through a Buenos Aires repeater from Cordoba (distance = 400 miles) is almost common occurrence.

Thanks, Yuri for stimulating me to sit down and putting some of my experiences on paper. I hope others are stimulated to do the same. I am sitting here in YN-land with a beautiful hilltop location but no ham license, as relations between our two countries are not exactly the best, and since I work for the U.S. government, well... But with a 40-meter dipole I can sit here in Nicaragua and listen to ragchews on 40 meter phone all across the U.S. even at noon, so guess conditions are open when one doesn't realize it.

Fred Laun, K3ZO, Nicaragua
ex: W9SZR, LU5HFI, HS3AL, HS5ABD, XV4AL, HI8XAL, HK3ABD

de VE3BMV:

Thanks Fred. Great to hear from you, at least through the mail!

Actually I have feeling that for the majority of ducting, we might be propagating at lower heights than we believed.

I am not denying that we can reflect from the ionosphere or as a matter of fact from anything. We know that we can bounce signals from mountains, buildings, airplanes or ionized gases. It appears that the majority of long distance propagating is done by refraction/ducting.

I think that with your W6PU quad, besides the height difference, you are also seeing the benefit of a better performing antenna.

As I was "coming down with sunspots" operating the monoband categories, I noticed that the same propagation patterns exist from 10 meters all the way down to 80 and 160. The same skewed path could be observed for the JA's from Toronto down to 80 m. The openings get shorter and less frequent with lower frequencies, but they are there! Also the characteristics of the propagation are similar. For example, 20 meter propagation at the high sunspot years sounds like 40 meters during the lower sunspot activity years: Good all night DX openings, local propagation during the noon, skewed path to far east, etc. This indicates that, as the height of the atmosphere decreases with declining sunspots, the propagation patterns shift down to lower frequencies. On the other hand, low bands at the high sunspot years might be experiencing longer openings (higher atmospheric noise levels too) but we are all busy chasing the stuff on higher bands, because it is so much easier. If there are any experiences from low banders during the high sunspot years, please let us know.

I wonder why the atmosphere over Argentina is thicker. Could it be because of the geographical features (Andes and Pampas) have something to do with it? Thinking of transequatorial VHF propagation, I think it should be a real possibility to establish contact between Argentina and US or Canada on 2 meters or even 70 centimeters. We should try for it during the next sunspots high.

Using antipodes, propagation benefits could be a real winner for the contest location selection. We need to pick the spot that is close to one area of high density ham population with another area (like JA) to be at antipodes. I guess LU8DQ and CXs were doing it for a while.

Using the directional antennas on 40 m and down is a real eye opener. Bands sound much better and more like the next band above.

We hope to hear you soon with /YN Fred!

(VE3BMV)

Bob Eldridge, VE7BS

I think most propagation experts will agree that the mechanism you describe is probably the way it is. But, they will disagree with your description of your theory. The current theory is pretty close to your thinking, except maybe for the use of the word "conduction".

1. "...present theory...is based on the assumption

that radio waves are propagated by reflections from a mirror-like ionosphere ..." "...the idea [of mirrors in the sky] has carried to the present..." Not so. Present theory says that the wave enters a layer, is refracted within it because of the varying degree of ionization with height, and emerges at various points just as you show in Figure 4. There is also chordal hop, which you have not mentioned.

2. To be fair, you should explain the term "reflection" in current theory means "virtual reflection from a non-existent mirror above". For example in your Figure 5, the signal conveniently said to be "reflected" from point M is actually the signal reflected along the path A-D-W within the layer. Rather like the signal reflected from the virtual image of an antenna below the ground - no one really believes there is a mirror antenna down there, but it is convenient to pretend there is!

3. The three basic statements in your summary at the bottom left of page 25 are in accord with current theory, except that it is generally accepted that radio waves are radiated rather than conducted and within the layers rather than along the borders.

4. "...one way propagation can be caused by different refractive indexes at both ends of the path..." This is difficult to rationalize. You are saying that a weak signal (the far end signal) will be refracted to a different degree than a strong signal (the one at the transmitting end). The transmitting signal would have to be powerful enough to cause local warming of the particles in the layer - that needs about 800 kW erp. I have seen cases of north-to-south versus south-to-north and east-to-west versus west-to-east non-reciprocal paths, but the explanations offered were not refractive index differences. As you say later, local noise conditions to differing receivers for transmitting you need an efficient antenna, for receiving you need good signal-to-noise ratio and efficiency is relatively unimportant.

5. "...most of the so-called 'short skip' signals are strongest at the low angle" This is more likely to because a lot of close-in communication goes via the E-layer. This factor is included in present propagation prediction programs, and I think Canada started it.

6. In Vol. 1 No.4 of the West Coast 160 meter Bulletin, I tried to explain the Pedersen Ray "the term used to describe a signal which has penetrated to the upper regions of the ionized layer, where the ions are more densely packed, has bent rather slowly and therefore stayed in the layer for a longer than usual distance, emerged from the lower side of the layer and arrived at the ground again further away than one would normally expect. If a lower-medium-frequency signal like 160 meters has entered the region at a high angle, thus getting through the D-layer quickly and more or less unscathed, and managed to get bent enough to form a Pedersen Ray, it will arrive at the other end without having suffered the extra losses of a signal which has had to bounce up and down between Earth and ionosphere". In the same article I briefly covered the " whispering gallery mode" and the chordal hop. This seems to me to be saying rather the same things you are saying, but I am not saying anything that is not currently accepted thought.

7. Your point about lower frequency bands being useful at periods of high solar activity is absolutely right. Whether the signal is reflected, refracted, conducted or whatever in the upper layer, that layer has to be ionized to do it.

8. "the best answers could be provided by satellites" Right on. The Alouette HF satellites were put up specifically to examine the ionosphere from above.

9. "Why should not radio waves behave in a similar manner [refract].?" They do, and 4/3 earth radius is the standard assumption for path loss calculations.

Maybe John devoldere will rise to the bait of "...when the signals are in the direction of the gray line..." so I'll refrain.

10. Scintillation. This point is not very important, but your analogy is not very appropriate. You have described dispersion. Scintillation is specifically sparkling - very sudden changes in intensity and sometimes very rapid. It does indeed happen, but much more at UHF than at HF.

11. I don't see anything sacrilegious in your in your article Yuri, and I can't imagine who the experts are that said he idea of ducting was absurd, even in 1980. I hope I don't disturb your sleep by suggesting you are guilty of orthodoxy, but so help me that's the way I see it. 73, Bob, VE7BS

de VE3BMV:

Thanks you for your comments Bob I will try to answer them based on my knowledge.

1. First of all, I might be missing some literature that showed the latest "current" theory in 1977. The books and magazines that I had the chance to see, especially prior to 1977 - 1980 when I described my theory, had only indicated that we were propagating on HF by bouncing the signals between the ionosphere and earth. Without exception, all illustrations were drawn not to scale, showing the "bouncing." I would like to see the sources saying that we propagate by ducting (conducting) on HF over large distances and showing the pictorial interpretation in scale.

The ARRL Antenna Handbook (1974) describing the sky wave propagation says: "By successive reflections at the earth's surface and in the upper atmosphere, communications can be established over distances of thousands and thousands of miles."

You also said in your "Chordal Hop Propagation Mode" article in the 160 m West Coast Bulletin: "...will arrive at the other end without having suffered the extra losses of a signal which has had to bounce up and down between the Earth and ionosphere." Obviously, at least at the time when you wrote it, you believed that we are "bouncing."

The 1982 edition of The ARRL Antenna Book still uses the bouncing idea and it also mentions the refraction and Pedersen Ray. (When did he come up with it?) It actually refers to the non-hopping theory but, I wonder to which one.

So, if we are talking about the current theory in my article published in 1980, it refers to those days. Was the current theory of today changed to accept my work? If so, I haven't been given any credit for it. If it was someone else, I'd like to see the articles. Please let me know the sources or send me a copy.

2. Yes, before, there was a mention that the reflection is not pure sharp, mirror like, reflection but rather a gradual refraction type "reflection" as shown in Fig.3 in my article. I have not seen any reference that we can be ducting in a layer, around the world as in Fig.6 or 7 in my article. Now I have a hard time accepting that what is shown in Fig. 3 is really happening. I have never seen the explanation of this ray "coming back" in the optics. The ray can get refracted and the angle changes. But I haven't seen the situation, where the ray would "reverse" its behavior and half way through its refraction would decide to "come back." I would like an explanation of that process. I can see this mechanism of refraction returning the ray back, happening at low angles, (and lower heights) over long distances as in my Fig. 5 or 7, but not at the sharp angles as in Fig.3.

When you refer to Fig.5 in my article, you have to look at the scale too. My argument is that rather than reflecting (refracting) in point M (and I show the possible refraction at that point by curving the line), we are refracting at lower heights and with lower refraction angles points A-D-E-G-H-Z. This makes more sense than the picture in Fig.3, which is frequently used in the textbooks and in propagation articles. There is a considerable difference in the amount of refraction in those two cases.

3. I don't think that my statements were associated with the current theory before 1980. I agree, that the word "radiate" applies better to the propagation of radio waves than conducting. Maybe we should coin a new word, something like RADUCTING - meaning radiation affected by refraction. We associate conducting with solid conductors, ducting more with solidly defined ducts. We could be propagating within the layer, rather than on the borderline of the layers, but this borderline is quite fuzzy and refraction happens at the borders of regions with different refractive properties.

4. One way propagation is definitely there. I have observed that sometimes, when it happens, the signals at the receiving end seem to be coming from everywhere - high and low angle. There is no distinct angle. This could be compared to a fiber optic bundle on which one end (RX) has a "mat glass" like surface. Light entering the bundle propagates with low loss and when it hits the mat surface, that becomes a secondary source and radiates in all directions (dispersion). When we are trying to enter the bundle from the "dirty" end, which is obstructed by the "dirt," a smaller amount of light gets into the fiber, therefore less "signal" is observed going the other way. That is the best analogy I can think of. In reality it probably translates to the atmosphere being in the state of "turbulence" (switch from day to night) while at the other end it has the chance to stabilize into better defined layers (middle of the night).

The differences in signal levels appear to be in order of 20 - 30 dB. I don't think that RF heating has much to do with it. Is there a better explanation?

5. Possible, but I have a feeling that there is also a refraction going on in the troposphere, similar to VHF.

6. The chordal hope was not mentioned in my article probably because I have a hard time accepting it if I draw the Earth and Atmosphere/Ionosphere in scale, as in Fig.6 and 7 of my article, as compared to your illustration in Fig.2 of your article (see below). Geometry just doesn't work out.

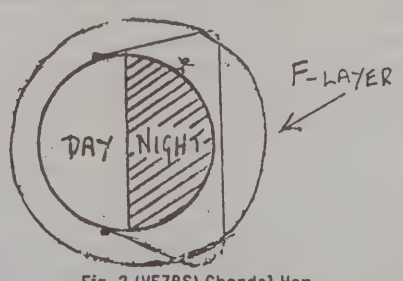


Fig. 2 (VE7BS) Chordal Hop

6. The Pedersen Ray idea I think, is the closest to what I am proposing. I have not read his works, but it appears to me (from the

illustration I have seen in your article and ARRL Antenna Book) that he is not talking about ducting (refracting) the signal for long distance communication. It looks like he is talking about "stretched hop." Again, you are still talking about bouncing, while I am talking about ducting in the layers without (or very little of) bouncing. I think that the Whispering Gallery Mode probably explains the antipodal propagation.

7. I think we can span larger distances on low bands at high sunspot years than during the low. The atmospheric noise is higher though (isn't that the indication that the band is "hot" propagation wise?).

8. Are the Alouette satellites still available? Is there any material on experiments conducted using them? I would like to get my hands on this information.

9. On the one hand you are saying that we are bouncing, on the other hand that we are refracting. How could they use 4/3 of the Earth radius for calculations, when the ionosphere is at high sunspot years 500 km (ARRL Book says even lower, 40 - 300 km) high and the Earth radius is 6378 km? That is more like one thirteenths or less of a Earth radius rather than one third.

10. You are absolutely right. Dispersion is the proper word and this is what I had in mind. Scintillation is a minor part of it.

11. Well, I still see the books proclaiming that we are bouncing between the Earth and ionosphere. There were some recent articles in the magazines that still claim this. There is some talk about the refraction, but to me it relates to the explanation of one hop "reflection" and not to ducting around the globe. You are still talking about bouncing, so help me, I can see the difference. As I mentioned, The ARRL Antenna Book now "admits" that there is also a ducting on HF, but VE3BMV was not given the credit for it, or listed in the reference material. I just wonder where it came from!

Thanks very much for your challenge Bob, I am looking forward to more discussions. I have to admit that I am having a hard time describing the mechanism of ducting, most likely due to the lack of proper analogy with which we could easily relate to. There is in my brain some subconscious information that I accumulated during my operating with stacked Razor Beams, but it is hard to express it. I was able to use this information on the bands, expect the openings and make many world record scores.

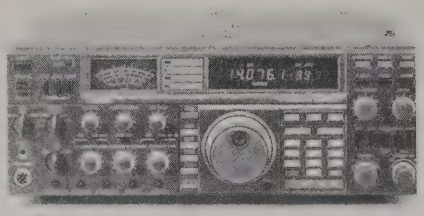
I hope to be able to devote more time to this problem, go back to previous research and find out as much as I can. Any help and critique is very much appreciated. I have not seen all the books on propagation and I may be ignorant in some respects. Those articles that I have read, all related to "bouncing." When I started to use my Razor Beams, it just didn't jive, and the results of my observations were formulated in my first article in CQ.

Let me again underline the main idea of my propagation theory: I believe that in long distance HF communications, we are propagating by ducting in the layers, that is, we refract the signals into the layers and by gradual refraction they follow the curvature of the layer and the Earth. This appears to be prevailing mode of propagation, contrary to "reflective" theory stating that we "virtually reflect" (by means of refraction) signals between the ionosphere and Earth's surface and use multiple reflections as it is still described in the literature.

Let's keep the debate going and get the facts straight! (VE3BMV)

NEW PRODUCTS

ICOM IC-761 HF TRANSCEIVER



ICOM has introduced a new HF transceiver, which incorporates advanced new features. It measures approximately 17 inches W by 6 inches H and 15 inches deep. It is conservatively rated at 100 W output on CW, SSB, FSK and SSTV. The final stage is using 28 V transistors (2SC2904) and whisper quiet cooling fan and large heat sink.

Built in is also a switching type of power supply and automatic antenna tuner capable of matching wide range of impedances from 16 to 150 ohms. Transmit frequencies include all ham bands plus MARS and CAP frequencies.

The IC-761's receiver tunes from 100 kHz to 30 Mhz with sensitivity exceeding .15 uV. It is a triple conversion superhet with low noise and direct feed mixer, having dynamic range of 105 dB with a selectable AGC action.

Features like pass-band tuning, IF shift, IF notch, dual adjustable noise blanker are included. Frequencies can be entered via built in keypad, computer interface or a tuning knob. 32 memory channels are available with two VFOs.

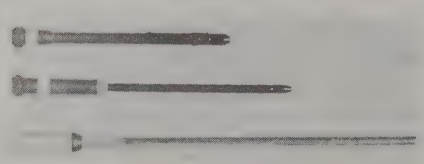
CW features include built in electronic keyer and steep CW filter. CW and RTTY selectivity is 500 Hz at 6 dB. Audio notch is greater than 45 dB. Semi and full break-in is rated to 60 WPM. One year warranty is supported by numerous ICOM service centers.

IC-761 will be available in April, pricing to be announced.

MFJ-280 COMPACT SPEAKER

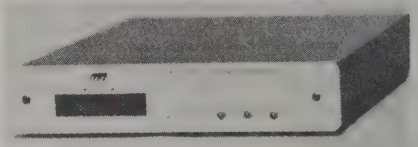
This high quality compact speaker ($18.95) is rugged unit with magnetic base and a tilt bracket. It comes with 3.5 mm phone plug, long cord and works with 4 or 8 ohm impedances. It can handle up to 3 watts of audio and has a dark grey military color to match most of the rigs.

3 NEW ANTENNAS FROM MFJ



Three high quality antennas are: MFJ-1710 ($9.95) is a 3/8 wave, 2 m telescoping antenna with BNC connector, 5.75" collapsed and 24.5" fully extended. MFJ-1712 ($14.95) is a 1/4 wave, 2 m, 5/8 440 MHz telescoping with BNC, 7.25" collapsed and 19" extended. MFJ-1714 ($16.95) is a 1/2 wave telescoping with BNC. It is an end fed, half wave dipole, which is shorter and lighter than 5/8 wave, when collapsed it performs like a rubber duck.

MFJ PACKET RADIO CONTROLLER



MFJ announces the MFJ-1274 ($169.95) their latest TAPR TNC-2 clone that works not only for VHF but also for HF, OSCAR and other non-FM packet. It features VHF, HF operation, 20 segment tuning LED indicator, a TTL serial port, lithium battery for memory back-up and a new cabinet. All you need is a computer with RS232 port and your rig.

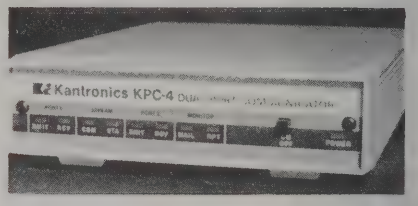
A starter pack for Commodore 64, 128 and VIC-20 is available ($19.95) with cables and software on a disk. It will not get obsolete, if standards change, software updates will accommodate the changes. Speeds of excess of 56k bauds are possible with a suitable external modem.

MFJ-1274 can be used as an inexpensive digipeater to link other packet stations. It features AX.25 Level 2 Version 2 software, hardware HDLC for full duplex, 256k EPROM, 16k RAM (expandable to 32k), simple operation, socketed IC, plus more. It comes with cable, serial port connector, manual and a 12V power supply.

MFJ-1274 is covered by MFJ's One Year Unconditional Guarantee, and if ordered directly from MFJ, it may be returned within 30 days for prompt refund, less shipping.

To order MFJ products, contact: MFJ, Box 494, Mississippi State, MS 39762, or call 800 647-1800, (601) 323-5869.

KANTRONICS KPC-4 DUAL PORT COMMUNICATOR



This new dual port communicator features two fully functional VHF packet ports, digipeating on each port, VHF gateway between ports, and an RS-232 computer port. Digipeating and gateway operations occur simultaneously while you're connected on one or both ports.

It is compatible with all computers via RS-232 port, including Commodores and PC compatibles. Stream switching provides for access to both radio ports, each of which supports the ARRL adopted AX.25 protocol. KPC-4 also contains the popular Personal Packet Mailbox TM feature. You or others can leave or retrieve messages from the Personal Packet Mailbox. Suggested retail price is $329.

Contact Kantronics, 1202 E 23rd St., Lawrence, KS 66046 (913) 842-7745.

MANUFACTURERS: Your New Product Releases reach your customers through RADIOSPORTING first. Deadline: 5th of the month.

KH6BZF PROPAGATION REPORT

Lee Wical, 45-601 Luluku Rd; CRT #44-25, Kane'Ohe, HI 96744

The first diagram shows the value of solar flux (top curve) and SSN - sunspot number (bottom curve). The Y axis and scale is the same for both. The X axis is calibrated in days of the month.

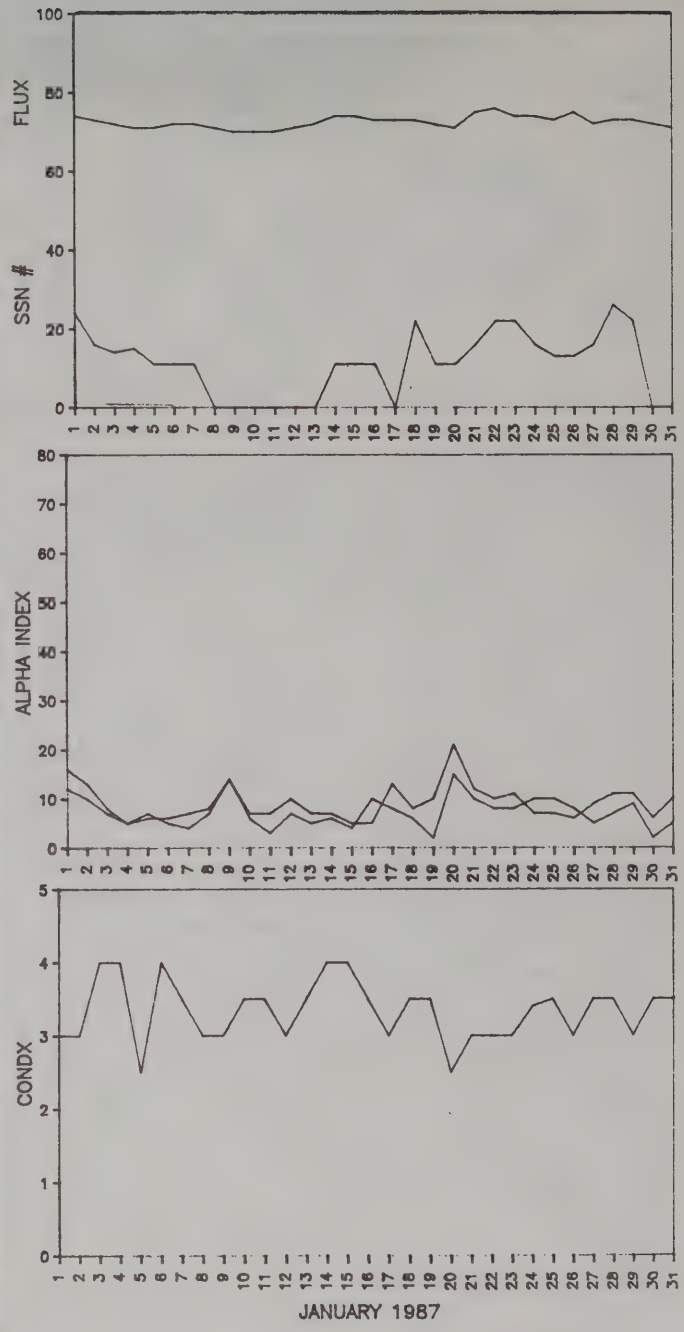
The second diagram shows variation of the Alpha Index for each day - an area limited by two curves. [I.e. A_r and A planetary (world value)]

The third diagram shows the propagation quality (CONDX), where the scale is: 5 = Above Normal, 4 = High Normal, 3 = Low Normal, 2 = Below Normal, 1 = Disturbed.

The Geomagnetic Field Level scale reads as follows: 0 = Very Quiet, 1 = Quiet, 2 = Unsettled, 3 = Active, 4 = Minor Storm, 5 = Major Storm.

To make your own forecast look at the diagrams and tables for values 27.5 and 55 days ago, also check the WWV transmissions (18 minutes after the hour) for daily values and make your own accurate predictions.

Statistical information is compiled by KH6BZF and processed on a computer by VE3BMV/W2.



THOUGHTS FROM THE RAINBOW BAY: Remember: It is never too late ... to have a happy childhood!!! Education is what you get from reading The Shortwave Propagation Handbook by W3ASK and N4XX... Experience is what you get from not reading it!!! It's the little things in life that make you happy... but only if you cannot get your hands on the bigger things!!! SEX... is a misdemeanor... the more you miss it... the meaner you get!!! A genius unable to express himself... is no better... than a silent fool. GD DX!

1987 JAN	CNDX	SOLAR FLUX	LEVEL	SSN#	GEOM.L FM	GEOM.L TO	ALPHA FROM	ALPHA TO	K	NOTES
1	3.0	74	VY LOW	24	1	1	12	16	3	RGN 4763(14)
2	3.0	73	|	16	2	2	10	13	3	RGN 4763(6)
3	4.0	72	|	14	1	3	7	8	2	RGN 4763(4)
4	4.0	71	V	15	1	1	5	5	1	RGN 4763(5)
5	2.5	71		11	1	1	7	6	0	RGN 4763(1)
6	4.0	72		11	1	1	5	6	1	RGN 4763(1)
7	3.5	72		11	1	1	4	7	1	RGN 4763(1)
8	3.0	71		0	1	1	7	8	2	NO SUNSPOTS, NO PCA
9	3.0	70		0	1	3	14	14	2	NO SUNSPOTS, NO PCA
10	3.5	70		0	1	1	6	7	1	NO SUNSPOTS, NO PCA
11	3.5	70		0	1	1	3	7	1	NO SUNSPOTS, NO PCA
12	3.0	71		0	1	1	7	10	1	NO SUNSPOTS, NO PCA
13	3.5	72		0	1	1	5	7	2	NO SUNSPOTS, NO PCA
14	4.0	74		11	1	1	6	7	2	RGN 4764(1) NEW REGION ON DISK
15	4.0	74		11	1	1	4	5	1	RGN 4764(1)
16	3.5	73		11	1	2	10	5	3	RGN 4764(1)
17	3.0	73		0	2	2	8	13	1	RGN 4764(0)
18	3.5	73		22	1	2	6	8	1	RGN 4764(1) 4765(1)
19	3.5	72		11	1	2	2	10	1	RGN 4766(1) NEW REGION
20	2.5	71		11	2	3	15	21	5	RGN 4766(1)
21	3.0	75		16	2	4	10	12	3	RGN 4765 SOLAR FLUX FLARE ENHANCED
22	3.0	76		22	1	2	8	10	2	RGN 4765(12)
23	3.0	74		22	1	3	8	11	2	RGN 4765(12)
24	3.4	74		16	2	2	10	7	2	RGN 4765(6)
25	3.5	73		13	2	1	10	7	1	RGN 4765(3)
26	3.0	75		13	2	2	8	6	2	RGN 4767(3)
27	3.5	72		16	1	2	5	9	2	RGN 4767(6) SOLAR FLARE C1.2/SN X-RAY@26/1514Z
28	3.5	73		26	1	2	7	11	3	RGN 4767(3) 4768(3)
29	3.0	73		22	2	1	9	11	0	RGN 4767(1) 4768(1)
30	3.5	72		0	1	1	2	6	0	NO SUNSPOTS, STRATWARM
31	3.5	71		0	1	1	5	10	2	NO SUNSPOTS, STRATWARM

KH6BZF PROPAGATION REPORT

Lee Wical, 45-601 Luluku Rd; CRT #44-25, Kane'Ohe, HI 96744

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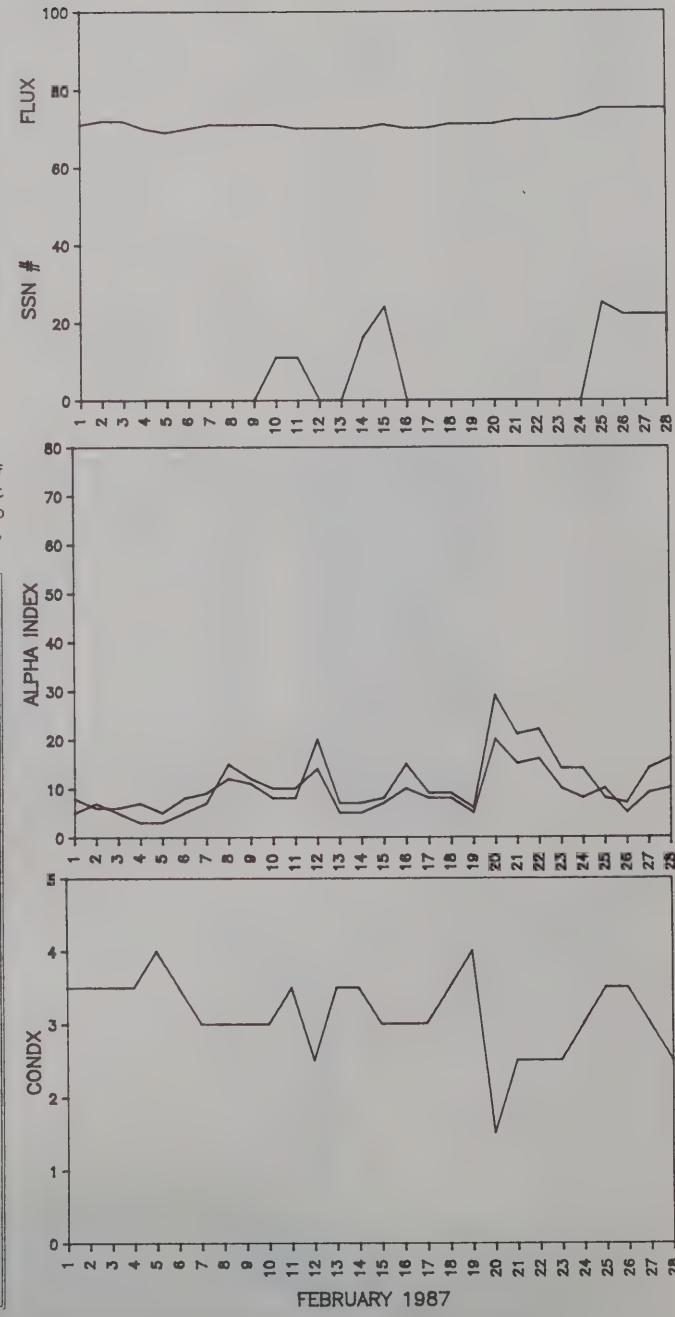

THOUGHTS FROM THE RAINBOW BAY: The First Law of Technology: Technology is dominated by two types of people... those who understand what they do not manage... and those who manage what they do not understand!!! To be sure that your money is safe... hide it in an empty beer bottle on your lawn... no one will pick it up there!!! (Jan.87 Reader's Digest) It is impossible to build a foolproof system... because fools are so ingenious!!! Failsafe circuits... will.... Good DX! See you all in Dayton!

1987 FEB	CNDX	SOLAR FLUX	LEVEL	SSN#	GEOM.L FM	GEOM.L TO	ALPHA FROM	ALPHA TO	K	NOTES
1	3.5	71	VY LOW	0	1	1	5	8	2	NO SUNSPOTS
2	3.5	72	|	0	1	1	7	6	3	NO SUNSPOTS
3	3.5	72	|	0	1	1	5	6	1	NO SUNSPOTS
4	3.5	70	V	0	1	1	3	7	2	NO SUNSPOTS
5	4.0	69		0	1	1	3	5	2	NO SUNSPOTS
6	3.5	70		0	1	1	5	8	2	NO SUNSPOTS
7	3.0	71		0	1	2	7	9	2	NO SUNSPOTS
8	3.0	71		0	2	3	15	12	4	NO SUNSPOTS
9	3.0	71		0	2	3	12	11	3	NO SUNSPOTS
10	3.0	71		11	2	3	10	8	2	RGN 4769(1)
11	3.5	70		11	2	3	10	8	0	RGN 4770(1)
12	2.5	70		0	1	3	14	20	3	NO SUNSPOTS
13	3.5	70		0	1	2	5	7	0	NO SUNSPOTS
14	3.5	70		16	1	1	5	7	2	RGN 4771(6)
15	3.0	71		24	1	1	7	8	1	RGN 4771(4)
16	3.0	70		0	2	3	10	15	4	NO SUNSPOTS
17	3.0	70		0	1	2	8	9	3	NO SUNSPOTS
18	3.5	71		0	1	2	8	9	1	NO SUNSPOTS
19	4.0	71		0	1	1	5	6	1	NO SUNSPOTS
20	1.5	71		0	2	4	20	29	4	RGN4772(1)
21	2.5	72		0	2	3	15	21	3	NO SUNSPOTS
22	2.5	72		0	1	4	16	22	2	NO SUNSPOTS
23	2.5	72		0	3	1	10	14	2	NO SUNSPOTS
24	3.0	73		0	1	2	8	14	2	NO SUNSPOTS
25	3.5	75		25	1	1	10	8	2	RGN4772(4) 4773(1)
26	3.5	75		22	1	1	5	7	2	RGN4772(1) 4773(1)
27	3.0	75		22	1	2	9	14	4	RGN4773(1) 4774(1)
28	2.5	75		22	1	3	10	16	2	RGN4773(1) 4775(1)

TRAFFIC - EMERGENCY

Rev. Chuck Clark, K4ZN

Route 3, Box 800, Monkcs Corner, SC 29461

ACTING AS NET CONTROL

Amateur traffic nets as well as many others, are usually operated with one station functioning as net control station. It is a practice taken over from military procedures, and something that the military would think of naturally. After all, control is what the military is all about, and communications and control just naturally go together. But it helps in amateur nets too, particularly when there are large numbers of stations involved. Furthermore, the idea is not limited to nets. Of course you have to have a net to have a net control station, but any station can act much like a net control station even when there is no net. A DX station in a pileup, for example, has to function somewhat like a net control.

On traffic nets, the net control station is usually appointed by the net manager. Nets that meet daily normally have net controls, hopefully seven different ones, designated for each day of the week. They function somewhat like the chairman of a meeting. They call the net to order (QND on CW), call the roll and take the list of traffic that the various stations wish to send, direct sending the traffic, excuse stations without traffic and for whom no traffic is listed, then adjourn the net (QNF on CW). The net control operator must also act as secretary, and is expected to give a report of the session to the manager after the end of the net.

Where do net control operators come from? Some people seem to think they come from Newington, Connecticut, and often exhibit the same feelings towards net controllers as to the organization that is headquartered there. Or else complain that they tried to check into the net but there was no net control station so they couldn't send their traffic. No, anyone may be a net control operator. There is no need to have a special endorsement on your license or an Official Net Control Station certificate (there isn't any, at least not yet).

Net managers appoint net control stations to try to make sure that someone will take charge when a session is scheduled. But in a volunteer activity like ours, it is bound to happen, and quite frequently, that the amateur designated to act as net control on a given day is unable to do the job. The usual rule is that when the regular net control fails to call the net within three minutes of the scheduled time, the alternate net control if one is designated and is on hand, or otherwise any other station on the net should call it to order and act as net control, and normally should continue to the end of the session, even if the regular net control station or the alternate checks in later. An exception is usually made if the regular net control station checks in very soon after the net has been called and can take over without delaying the net's operation.

Often that's a good way to try your hand as net control, offer to take over when the regular station fails to show up. Let the others know you're new at the game and ask them to help. Of course they would soon know it anyway, but asking their help might make them more ready to assist, knowing that you welcome it.

MARS nets have well-developed training programs, but few amateur nets have any regular training programs for net control stations, they seem to assume that you pick it up as you go, whether from reading the ARRL books on the subject or from listening to the others. The net manager may have a page of instructions for net control stations, but often it is rather sketchy and treats mainly of topics special to that particular net. You'll find helpful information in various ARRL publications, some free, some for sale.

The best way to prepare is to combine both reading and listening, with each providing information and serving to correct and illustrate the other. Part of what you will learn by listening and reading is how not to act as net control, and how to avoid the mistakes you hear. And while you listen, have a piece of paper before you and keep a net control log as you would if you were actually controlling the net. Record the stations as they check in and list their traffic and try to anticipate what the net control operator will do to move the traffic. Doing this for practice will make the job much easier when you do it for real.

Net control operators generally begin with some kind of spiel to call the net to order. It may be that the net management has directed net control operators to use a specific opening statement, and if so, of course you should use it. Otherwise you make up your own. The word here is KISS: keep it short, stupid. The purpose of these opening remarks is not so much to tell anybody anything, rather it's to enable the net stations to find the net frequency (at times you find the listed frequency occupied and so should move to a nearby clearer spot if possible. It's generally bad public relations for nets to ask others already on a frequency to move so a net can start). So thirty seconds or so is usually enough. If they don't find you during your opening words, they will soon find you anyway, as it's usually not hard to identify an activity as a net in session. Long explanations about the purpose of the net and its past history and its times and frequencies and its sponsoring organization and net manager only delay starting the net. The regulars already know it, and it's not often that an interested outsider is listening. That outsider can always ask anyway, and you can answer the specific question more rapidly.

Next you call for checkins. On nets where checkins are numerous, it's necessary to have some order for checking in, otherwise there will be doubling, tripling, quadrupling, and you will take forever to get everybody checked in. Such nets generally have some established order for stations to check into the net (QNA on CW). On 20-meter phone nets, it's usually done by prefixes, countries, geographic areas, or the like: "Stations in South America," "W4 stations," etc. Some nets ask stations with traffic to check in first, or assigned liaison stations. Others go through the alphabet by call sign suffixes, "Stations alpha through delta please check in." In this, you simply follow the net manager's instructions or the usual practice on the net.

It's usually best to pair up stations and move them off frequency to pass traffic as soon as you can, and not wait until all have checked in. That keeps things moving, particularly if the net handles any volume of traffic. If there are only a few messages to handle, it's often simpler to clear them right on net frequency. If someone has a big list of traffic for various destinations on the net, move that station off frequency and send the others there in succession to pick up their traffic. Handle liaison stations in the same way: spot your representative for the region net and then send stations there in succession to clear their out-of-section traffic. And if one station checks in with a long list for one other station, clear both first, and then move them off to pass their stack of messages.

While traffic is being handled, don't forget to give calls occasionally for additional stations to check in. Probably better to use the word "additional" rather than "late," it doesn't carry the accusing connotation.

When all the traffic is cleared, the formal part of the net is over. Then, depending on the net, you either close the net (QNF on CW) or go into informal ("ragchew") session, where you may be expected to continue to recognize stations as you did during the formal portion of the net. Once the net is closed you usually have one more duty to perform, prepare the report for the manager. What that contains depends on what the manager wants, it can be as simple as giving the number of stations checking in and the number of messages handled, or it can require listing of all stations by call sign, how many messages each brought, how many were relayed, how long the net was in session, and maybe more.

There's no law that says every amateur must handle traffic, let alone control a net, or even know how, but it's a good skill to have, and may be quite valuable in an emergency.

(K4ZN)

K1MAN QUESTIONED BY FCC

The FCC has served notice on Glenn Baxter, K1MAN, that his assistance to CBS network news during the October, 1986 El Salvador earthquake may have been a violation of FCC prohibition against the use of amateur radio for business communications purposes. During the early hours of the devastation to the tiny central American nation, Baxter's International Amateur Radio Network was among the few known links between the media and the quake hit nation. In fact during the hours just following the quake, there was no way for anyone to accurately determine if any other means of communication existed, particularly into the city of San Salvador. Baxter thought that he was providing a service within the framework of the spirit of the amateur rules, but now he has been informed that his well meaning efforts may carry with them some severe penalties.

The FCC notified Baxter of the apparent rules violation in a letter written by Personal Radio Bureau Chief John Johnston, W3BE, based on a letter of complaint to the FCC from Colonel Thomas J. Kay of Panama City, Florida. Kay was monitoring operation of the net and wrote to FCC questioning its legality. He also supplied FCC with a tape that included some "apparent instances" of interviews being conducted by CBS network reporters using K1MAN station. Unknown is why Col. Kay filed this complaint in the first place. (Westlink)

CONTEST RULES

FRANK ANZALONE, W1WY
CQ Magazine
14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	**Mar.**	**28-29**	**CQ WW WPX SSB Contest**
*	Mar.	28-29	UBA SWL Phone Award
	Apr.	4	Holiday-In-Dixie QSO Party
	Apr.	4-5	IBM QSO Party
	Apr.	4-5	Connecticut QSO Party
	Apr.	4-5	Poland "SP" DX Contest
	Apr.	8-10	DX YL to NA YL CW
	Apr.	11-12	Montana QSO Party
	Apr.	11-12	CARF Commonwealth
	Apr.	15-17	DX YL to NA YL SSB
	Apr.	18-19	ARCI QRP Spring CW
	Apr.	25-26	Swiss "Helvetia" Contest
	Apr.	25-26	North Carolina QSO Party
	May.	2-3	Utah QSO Party
	May.	2-3	County Hunters SSB
	May	9	Nevada QSO Party
	May	23-24	UBA SWL CW Award
	May	30	ARCI QRP CW Sprint
	May	**30-31**	**CQ WW WPX CW Contest**
	June	6-8	PVRC On The Air Reunion
	June	13-14	ARRL VHF QSO Party
	June	13-14	South America CW Contest
	June	20-21	SMIRK (6 M) QSO Party
	June	27-28	ARRL Field Day
	July	11-12	IARU World Championship
	July	**18-19**	**CQ WW WPX VHF Contest**

U.B.A. SWL Trophy

Phone: March 28-29 CW: May 23-24
0000Z Saturday to 2400Z Sunday

This SWL activity will be held annually on the last weekends of March and May and replaces the UBA Cup competition held in January and February.

Only 6 hours may be used out of the 48-hour contest period, 3 continuous hours on Saturday and the other 3 hours on Sunday.

Bands: 3.5-28 MHz. (no WARC bands).

Logs: To be columned as follows: Date/time in GMT, "station heard," RS(T) by the SWL, "station worked," points and multiplier. "Station heard" may be logged once only per band. (No CQ, QRZ, etc.) If points are claimed for both stations in QSO, the call of each must appear in the "station heard" column. Call of "station worked" may not appear more than 10 times on each band.

There is a penalty of 3 times the value of the "station heard" for duplicate logging, 1 point for "station heard."

Points: Stations in SWL's own continent 1 point; stations outside own continent 2 points.

Multiplier: Each different prefix heard on each band.

Final Score: Total points from all bands times the total prefixes on all bands.

Awards: Certificates to the top 5, and the first in each country with a reasonable score. Also the top YL and multi station.

Entries must be postmarked no later than 4 weeks after the end of each contest.

They go to: Marc Domen, ONL 6945, Gebr. Blommestraat 14, B-2200 Antwerpen (Borgerhout) Belgium.

Holiday-In-Dixie QSO Party

1800Z to 2300Z Saturday, April 4

The Holiday-In-Dixie Celebration is an annual 10-day event commemorating the Louisiana Purchase and is held in Shreveport and Boosier City, Louisiana. The QSO Party is one of the many events during the celebration, and demonstrates ham radio to the public.

Exchange: Name, QTH, and RS(T). (Be sure to get the operator's name.)

Frequencies: SSB is the primary mode, 7235 on 40 and 14245 on 20. There will be some CW operation for Novices on 7115 and 21115 kHz.

Awards: A Holiday-In-Dixie certificate will be awarded to all participants.

Send your QSL card and an SASE to: Holiday-In-Dixie QSO Party, c/o WA5ARJ, P.O. Box 4842, Shreveport, LA 71134.

Connecticut QSO Party

2000Z Sat. to 0500Z Sun., April 4-5
1200Z Sun. to 2000Z Sun., April 5
Rest Period: 0500Z to 1200Z

The Candlewood ARA is again sponsoring this year's party. Rules the same as those used in previous years.

The same station may be worked on each band and each mode for QSO points. DX stations count for QSO points, but for only one multiplier.

Exchange: RS(T), QSO number, and QTH. County for CT stations, ARRL section for others.

Scoring: One point per contact, 2 points if it's with a Novice, 3 points for Oscar contacts, and 5 points if you work W1QI, the club station.

CT stations multiply total QSO points by ARRL sections, plus one DX station worked for their final score. Others use CT counties worked for their multiplier (maximum of 8).

Frequencies: CW—40 kHz up from bottom of each band. SSB—3927, 7250, 14295, 21370, 28540. Novice: 3725, 7125, 21125, 28125.

Awards: Certificates to the highest scorer in each state. A "Worked All Connecticut" certificate to those working all counties.

Mailing deadline for all entries is April 30th to: Candlewood ARA, Att: R. Dillon, N2EFA, RFD #7, Noel Court, Brewster, NY 10509. Include a large SASE for a copy of the results.

Montana QSO Party

000Z Sat. to 1800Z Sun., April 11-12

The Yellowstone Radio Club reactivat- this event and intends to continue it in spring each year. The same station y be worked on each band and each ode. Mobiles in each county change. ly single operator stations are eligible.

Exchange: QSO number and QTH. unty for Montana stations; state, prov- e, or DX country for others.

Scoring: One point per QSO on phone, 2 points if on CW. Montana mobiles are worth 5 points on phone, 10 points on CW.

Multiplier: Montana stations use states, VE provinces, DX countries, and Montana counties. Non-Montana stations use Montana counties (maximum of 56).

Frequencies: CW—3565, 7065, 14065, 21065, 28065. Phone—3940, 7260, 14280, 21370, 28600. Novice—3710, 7110, 21110, 28110 kHz.

Awards: Certificates to the top scorers in each state, VE province, and DX country, and the top 10 Montana stations. There will also be plaques for the overall winners in seven different areas—U.S., U.S. Novice, DX, VE, Montana fixed, mobile, and Novice.

All logs must be received by May 15th and go to: Gina Williams, N7IBG, 11 Gatewood Drive, Billings, MT 59102.

ARCI QRP Spring CW Contest

1200Z Sat. to 2400Z Sun., Apr. 18-19

Participation is open to members and nonmembers. Operating time is limited to 24 hours out of the 36-hour period. The same station may be worked on each band for QSO and multiplier credit.

Exchange: RST and state, province, or country. Members will include their QRP number; non-members their power.

Scoring: Contacts with a member 5 points, with a nonmember in the same continent 2 points, but 4 points if on a different continent.

There is a power multiplier as follows:
4 to 5 watts output—×2
3 to 4 watts output—×4
2 to 3 watts output—×6
1 to 2 watts output—×8
Less than 1 watt out—×10
Over 5 watts output—check log.

There is a bonus multiplier of ×2 for stations using solar or wind power. And ×1.5 if using battery.

Final Score: Total QSO points × (states + provinces + countries) worked on each band, × power multiplier × bonus multiplier if any.

Frequencies: 1810, 3560, 7040, 14060, 21060, 28060, 50360. Novice: 3710, 7110, 21110, 28110.

Awards: Certificates to the highest scorers in each state, province, and country with two or more entries. Scores will be credited for the annual "Triple Crown" QRP award. Also a special certificate from Adrian Weiss, WØRSP, to stations using less than 1 watt.

Use a separate log sheet for each band and a summary sheet showing the scoring and other essential information. Scoring sheets are available from KA5NLY. Include a large SASE with your request. Include an SASE if you desire results of contest.

Logs must be received no later than a month after the end of the contest and go to: QRP ARCI Contest Chairman, Eugene Smith, KA5NLY, Pentagon, P.O. Box 46599, Washington, D.C. 20050-6599.

Swiss Helvetia Contest

1300Z Sat. to 1300Z Sun., Apr. 25-26

The Swiss usually try to activate some of the rare Cantons, so this offers a good opportunity to build up your totals for the attractive Helvetia Award. Confirmation of all 26 Cantons is required. Only contacts made after January 1, 1979 are valid.

All bands may be used, 1.8-28 MHz, phone or CW (but not the new WARC bands). The same station may be worked on each band for QSO and multiplier credit, but only on one mode, either phone or CW.

Exchange: RS(T) plus a three-figure QSO number. Swiss stations will also include two letters identifying their Canton. Abbreviations of the Cantons are as follows: AG, AI, AR, BE, BL, BS, FR, GE, GL, GR, JU, LU, NE, NW, OW, SG, SH, SO, SZ, TG, TI, UR, VD, VS, ZG, ZH.

Scoring: Each HB contact is worth 3 points. The sum of Cantons worked on each band is your multiplier (a possible total of 26 on each band).

Final Score: Total QSO points multiplied by the sum of Cantons worked on each band.

Awards: Certificates to the top scorers in each country and each USA and Canadian call area.

Indicate a Canton in a separate column for each band the first time it is worked. Check your log for duplicate contacts and include a summary sheet showing the scoring and your name and address in block letters. The usual signed declaration is also requested.

Mail your log within 30 days to: USKA Traffic Manager, Walter Schmutz, Gantrischweg 1, CH-3114 Oberwichtrach, Switzerland.

Applications in the form of QSL cards for the Helvetia Award go to: Max Bindschedler, HB9MX, Strahleggweg 28, CH-8400 Winterthur, Switzerland.

North Carolina QSO Party

1200Z Sat. to 0400Z Sun., April 25-26

The Alamance ARC (K4EG) of Burlington, North Carolina is sponsoring this one. The same station may be worked once on each band and mode and mobiles on each county change.

Exchange: RS(T) and QTH. County for NC stations; state, VE province, or DX country for others.

Scoring: One point for phone contacts, 2 points for CW contacts, and 5 points for Novice contacts.

NC stations multiply total QSO points by (states + provinces + countries + NC counties) for their final score. Others multiply NC QSO points by number of NC counties worked (maximum of 100).

Frequencies: CW—3540, 3740, 7040, 7140, 14040, 21040, 21140, 28040, 28140. SSB—3860, 7260, 14260, 21360, 28360 MHz.

Awards: Awards and certificates will be awarded commensurate with number of entries received.

Mailing deadline is June 30th to NC QSO Party, c/o K4EG, P.O. Box 3064, Burlington, NC 27215. Include a large SASE for copy of results and certificates.

Utah QSO Party

0000Z to 2400Z Saturday, May 2

This is a joint effort sponsored by the Utah ARC and the Utah DX Assn. to make this rather rare state available for WAS and other awards.

Exchange: RS(T) and QTH. County for Utah; state, VE province, or DX country for others. (Novice and Tech. stations must identify by signing "N" or "T" after their call.)

Scoring: Utah stations score 5 points for Novice or Tech. contacts, 3 points for all other QSOs.

Out-of-state stations score 5 points for Utah Novice or Tech. contacts, 3 points for all other Utah QSOs.

Multiplier: States + VE provinces + DX countries worked for Utah stations. Utah counties per band for out-of-state stations (maximum of 29 per band).

Frequencies: CW—1810 and 60 kHz up from bottom of each band. SSB—1860, 3980, 7280, 14280, 21380, 28680. Novice—3710, 7110, 21110, 28110.

Awards: Certificates to the winners in each state, VE province, DX country, Novice in each state, and the top three winners and Novices in Utah.

Mailing deadline is June 1st to: Curt Wilbur, K7CU, 907 East 250 South, Bountiful, UT 84010. (Include an SASE for a copy of the results.)

County Hunters SSB Contest

0001Z Sat. to 2400Z Sun., May 2-3
(Off: 0800 to 1200 each day)

This is the 16th annual contest sponsored by the Mobile Amateur Radio Awards Club to increase activity for the County Awards program. The two four-hour rest periods are mandatory.

Emphasis is on mobile operation. Fixed stations may work other fixed stations, but only once regardless of the band. Mobiles may be worked from each county or band change. Mobiles contacted on a county line count as one QSO but two multipliers. QSOs made on a Net frequency do not count.

Exchange: Signal report, county, and state; country for DX stations. (Mixed-mode contacts are permitted providing one station is on SSB.)

Points: Contacts with a fixed W/K, 1 point (including KH6/KL7). W/K contacts with VEs, 3 points. W/K contacts with DX, 5 points. Contacts with U.S. mobiles, 15 points.

Final Score: Total QSO points times total number of U.S. counties worked.

Frequencies: 3870-3890, 7225-7250, 14250-14285, 21360-21380, 28570-28600. Following spots considered "Mobile Windows": 3875, 7240, 14270 (plus or minus 5 kHz). Fixed stations must QSY after working a mobile.

Awards: Plaques to the first- and second-place U.S. mobile, top-scoring fixed U.S./Canadian, DX station, and Mobile Team. Certificates to the top 10 mobiles, and to the top scorers in each state, province, and DX stations.

It is suggested that you send a large SASE to WA5DTK for detailed rules and log forms. All entries must be received by June 3rd and go to: Barry Brewer, WA5DTK, 1013 North Blvd., Universal City, TX 78148. Winners will be announced in the MARAC Newsletter. (Include a large SASE for copy.)

My commentary this month is going to be a bit on the negative side. Since this is being written right after our 160 Meter CW Contest in January, I feel that I have cause to express my criticism.

Conditions during the contest were fairly good, and like in any contest, activity was intense and competitive—as a matter of fact, a little too competitive.

As in all sporting events, there are certain rules and guidelines that must be observed. One of our rules was that U.S. and Canadian stations keep the DX Window (1825-1830 kHz) free of activity so that DX stations could use it for split-frequency operation. However, many prominent stateside stations blatantly ignored this regulation and solicited contacts with other stateside stations in the DX Window during prime DX hours. Whether you do or do not approve of this regulation is not the point. The fact remains that it was a contest rule, and it was being violated.

To their credit, many Europeans tried to use the DX Window band plan, but it was very difficult copying them through the heavy stateside QRM, cancelling any advantage we tried to give them. What makes it more disturbing is the fact that many prominent contesters who will be claiming high winning scores were the biggest offenders. This is hardly fair to those stations who were observing this regulation.

The top band, which was known as the "Gentleman's Band" at one time, was comparable to the well-known sport of "golf." Now it has suddenly deteriorated to the level of another well-known sport, "hockey." A rather unusual comparison, but I'm sure you get the point.

73 for this time, Frank, W1WY

郵政省後援 RESULTS 1986 CQ AA CONTEST

第27回 ALL ASIAN DX コンテスト結果

via JE1CKA 電話部門

CW SINGLE OPERATOR - SINGLE BAND WORLD LEADERS

Band / 大陸	1.9	3.5	7	14	21	28
AF	—	—	—	EA8/EA8YU/990	—	—
EU	UA4HTZ/1596	UA6AX/4488	RB5MA/13532	HA7KSR/51207	RB5IM/14640	YU1LM/1
OC	—	—	YB8/KA7KSY/165	VK5AGX/11426	YCøBRX/37044	—
NA	N6TR/7/1218	W6RJ/10890	N6AW/43492	N6VI/20215	N6ND/400	—
SA	—	—	LU4FDM/14606	—	—	—
AS	UG6GAW/14601	UA9SP/27648	JA5BJC/44776	JR6EZE/56551	UJ8JA/7293	JH9HXF/1/98

CW SINGLE OPERATOR - ALL BAND WORLD LEADERS

Call / Band		1.9	3.5	7	14	21	28	Total	Score
AF	EA8BIE	—	—	2/2	23/15	8/7	—	33/24	792
EU	UA4HNP	78/12	150/34	167/60	269/78	17/14	1/1	682/199	135718
OC	KX6ND	84/16	78/27	135/59	207/58	438/75	65/37	1007/272	273904
NA	K6NA	36/7	144/36	415/77	243/63	39/25	—	877/208	182416
SA	OA4ZV	—	80/21	140/46	110/42	16/11	—	346/120	41520
AS	UF6FFF	225/22	494/41	546/44	1006/56	174/37	8/2	2453/202	495506

CW

NORTH AMERICA

PANAMA					
★HP1AC		7	19	11	209
CANADA					
★VE7FJE		14	155	41	6355
VE1ASJ		14	33	25	825
VE2AEJ		14	1	1	1
★VE2LJ		M	5	4	20
COSTA RICA					
★TEøX		7	20	17	340
★TI2CCC		14	49	25	1225
U.S.A					
★N6TR/7		1.9	87	14	1218
★WøZV		1.9	51	11	561
W7QID		1.9	18	4	72
★W2FCR		1.9	3	1	3
★W6RJ		3.5	242	45	10890
★W7RX		3.5	176	34	5984
★W5FO		3.5	78	20	1560
K7CW/5		3.5	50	14	700
★N6AW		7	524	83	43492
W6KP		7	532	75	39900
★KøOST		7	8	7	56
★W5NR		7	8	1	8
★N6VI		14	311	65	20215
NI6W		14	131	42	5502
★WF5E		14	67	28	1876
WA6FGV		14	56	27	1512
W6SZN		14	36	23	828
★W1OO		14	27	21	567
K1TO		14	14	10	140
★KA7FEF		14	12	9	108
★KW2J		14	9	9	81
AA6EE		14	6	5	30
W1END		14	3	3	9
★N6ND		21	25	16	400
★K6NA		M	877	208	182416
W6TMD		M	791	161	127351
★KY7M		M	331	114	37734
K5MM/7		M	307	107	32849
★WN4KKN		M	290	99	28710
K7LXC		M	222	73	16206
W6UQF		M	169	75	12675
WX4G		M	146	71	10366
K6EID		M	132	69	9108
W7KJJ		M	139	61	8479
★K1ZM		M	113	54	6102
★W3GM		M	93	59	5487
W6ISQ		M	91	45	4095
W7YF		M	78	39	3042
WG6H		M	54	34	1836
W6HAL		M	57	31	1767
K6BWX		M	47	29	1363
N3BNA		M	9	8	72
★KG9N		M	4	4	16
★K3EST/6		MM	1238	231	285978
N6VR		MM	1014	201	203814
★NR5M		MM	764	177	135228
ALASKA					
★WL7E		M	231	4	924

SOUTH AMERICA

ARGENTINA					
★LU4FDM		7	218	67	14606
LU6KG		7	37	23	851
★LU1EWL		M	80	59	4720
LU7JI		M	68	13	884
PERU					
★OA4ZV		M	346	120	41520
BRAZIL					
★PY5MR		M	46	36	1656
VENEZUELA					
★YV5GRV		M	28	21	588

PHONE

NORTH AMERICA

CANADA					
★VE3XN		14	78	44	3432
HQ. UNITED NATIONS					
★4U1UN		MM	64	21	1344
COSTA RICA					
★TI2ANL		14	35	28	980
★TI2KD		M	177	77	13629
U. S. A.					
★W6RJ		3.5	132	30	3960
★NA5S		14	324	75	24300
★W6SZN		14	286	64	18304
★K9RHY		14	131	48	5288
★W2FCR		14	97	44	4268
★K3ZJ/4		14	85	45	3825
N4MM		14	80	46	3680
WX4G		14	75	38	2850
NG2X		14	71	40	2840
★W8EX		14	63	39	2457
NQ4I		14	59	36	2124
★W3GG		14	54	29	1566
LU3YL/W4		14	46	28	1288
W6OK		14	43	22	946
★W1OO		14	31	23	713
W4WIJ		14	31	21	651
★KA7FEF		14	18	12	214
WA3DMH		14	13	12	156
W1FJ		14	12	10	120
KW2J		14	8	11	88
JF1FZI/W6		14	7	5	35
W5EIJ		14	3	2	6
★K7SS		28	19	13	247
★K3EST/6		M	1216	261	318592
K6NA		M	1172	264	309408
K6EID		M	187	83	15521
★KøVVV		M	206	70	14420
★K3ZO		M	187	72	13464
★W7NO		M	134	52	6968
KC7V		M	75	38	2850
★N6AW		MM	610	144	87840
W1GY		MM	245	63	15435
★KM7U		MM	8	1	8
ALASKA					
★KL7XD		M	269	91	24479

SOUTH AMERICA

URUGUAY					
★CX3CX		M	170	75	12750
★CX2AAL		M	125	72	9000
ARGENTINA					
★LU4LAV		14	195	53	10176
BRAZIL					
★PY1APS		7	6	5	30
★PP5OW		21	3	2	6
VENEZUELA					
★YV6BTF		14	7	6	42

FCC NEWS

BILL GRENFELL, W4GF

7216 Valleycrest Blvd., Annandale, VA 22003

ON 01/28/87 FCC ACTED ON IT'S PROPOSAL TO AMEND PART 97 TO EXPAND NOVICE AND TECHNICIAN CLASS AMATEUR OPERATOR'S PRIVILEGES TO INCLUDE CW, RTTY AND SSB OPERATION ON SUBBANDS WITHIN THE 28.0-29.7 MHz BAND WITH LESS POWER OUTPUT THAN AUTHORIZED FOR OTHER CLASSES OF OPERATORS IN THE BAND. The Commission's action in PR Docket No. 86-161 also included provision for Novice licensees to operate on subbands in the bands 220-225 and 1215-1300 MHz bands, with limited transmitter power. Novice operators may use all emissions permitted for other class operators in the 220-225 and 1215-1300 MHz bands. See rule section 97.61(c). Details regarding the subband frequencies, transmitter power ceilings and the effective date of the new privileges were not available as this was written.

ON 01/30/87 FCC ANNOUNCED THAT AMATEUR OPERATOR EXAMINATION ELEMENT 3 IS TO BE SEPARATED INTO TWO ELEMENTS: 3A FOR TECHNICIAN CLASS LICENSE CANDIDATES AND 3B FOR GENERAL CLASS. Effective date and other details were not included in the release.

THE EXAMINATION CREDIT RULES BECAME EFFECTIVE ON 02/13/87. This permits an examinee who has passed the written element(s) for a given class of amateur operator license, but has not yet taken, or has failed the code test, to receive credit for the written element(s). This permits Volunteer Examiners to give credit for that written element any time up to 365 days after the written element was passed. (PR Docket No. 86.63). (Westlink Report, 01/23/87).

FCC HAS ISSUED A REQUEST FOR COMMENTS ON THE ESTABLISHMENT OF A SYSTEM WHEREBY AMATEUR LICENSEES COULD CHOOSE THE CALL SIGNS THEY USE TO IDENTIFY THEIR STATIONS IN ACCORDANCE WITH IDENT. PROCEDURES REQUIRED BY RULE 97.84. Such calls would be available through a Special Call Sign Coordinator (SCSC) who would be allowed to recover only administrative costs. FCC would only issue one 2x3 call sign from the NA-NZ prefix block to each licensee. The FCC view is that having only one SCSC would be more efficient, more consistent and simplify the FCC - SCSC contact. The comments on this "PRB-3" proposal are due by April 22, 1987 and reply comments are due by 05/22/87. (ARRL, 02/03/87). Comments should refer to PRB-3 and be addressed to FCC, Washington, D.C. 20554.

FCC'S RELEASE OF A FURTHER PUBLIC NOTICE ENCOURAGING VECs TO USE THE EXISTING EXAMINATION QUESTION POOL THROUGHOUT 1987 AND TO COOPERATE IN CREATING A NEW ONE, HAS THE ARRL "...EVALUATING THE LATEST ANNOUNCEMENT TO DETERMINE WHETHER IT GOES FAR ENOUGH TO RENDER THE ARRL PETITIONS MOOT." (ARRL, Letter 01/13/87). A FCC Public Notice issued 12/19/86 "...stated that the Commission expected all VEC's to honor the agreements made at the 1986 Conference of VEC's. One of these commitments was that no question pools would be revised by VEC's until January 30 1988..." (W5YI Report, 01/15/87).

THE CHIEF OF FCC's GETTYSBURG (PA) GENERAL RADIO BRANCH ADVISED LAST DECEMBER THAT THEY WERE RUNNING BEHIND ON PROCESSING AMATEUR LICENSE APPLICATIONS "...ABOUT 8 WEEKS FROM THE TIME THAT WE RECEIVE THE APPLICATION." Counting time in the VE/VEC system this adds up to 10 to 12 weeks. He said "...he had three people working strictly on amateur licensing and one passed away in September. "We don't know if we are going to replace that person or not." (W5YI Report, 01/01/87). One D.C. FCC official advised me that Gettysburg keeps getting more and more work handed to them without any increase of personnel.

THE GENERAL RADIO BRANCH AND THE AVIATION AND MARINE BRANCH HAVE BEEN MERGED AT THE FCC's GETTYSBURG, PA LICENSE PROCESSING FACILITY. "The new unit is called the Special Services Branch and is headed by Marcus Stevens. "The FCC's contact person for amateur VEC matters at Gettysburg remains Larry Weikert." (ARRL Letter, 01/13/87).

THE ARRL HAS FILED COMMENTS AGAINST AUTHORIZING ADDITIONAL 40 METER FREQUENCIES (7050 - 7075 kHz) FOR NOVICE AND TECHNICIAN OPERATORS IN ALASKA, HAWAII, AND REGION 2 PACIFIC AND CARIBBEAN INSULAR AREAS (PR Docket 86-397). The League stated that "All nighttime communications for Novices on 7100-7150 kHz are difficult, whether in the 48 contiguous States or in Hawaii, Alaska, Pacific or Caribbean areas and there is no compelling reason to make a special exception for any area." It concluded that Novice privileges "...soon may be significantly increased due to the Novice Enhancement proposal." (ARRL Letter, 01/13/87). (See report on PR Docket 86-161, first paragraph above).

A POINT LOMA CALIFORNIA EXTRA CLASS AMATEUR WAS FINED $750 FOR OPERATING A PIRATE BROADCAST STATION ON 7473 kHz DURING EARLY 1986. Jerry Gastil, K6DYD, used an alias while on the air as the "Voice of the Pacific Southwest" with the unauthorized call sign KIWL. Gastil was also fined $50 on 07/05/85 for operating a repeater in San Diego without proper identification. (W5YI Report, 01/15/87).

THE FCC WAS -NOT- CONSIDERING ALLOWING HOUSEHOLD MEMBERS TO OPERATE UNDER AUTHORITY OF ANY EXISTING AMATEUR'S LICENSE "AS RUMORED", SAID RAY KOWALSKI, CHIEF OF FCC'S SPECIAL SERVICE DIVISION (on 01/09/87 in response to a query by Fred Maia, Editor, W5YI Report).

ON JANUARY 16, FCC CHAIRMAN MARK S. FOWLER ANNOUNCED HIS INTENTION TO RETIRE SOMETIME THIS SPRING. His regular term expired last June. Unless he had been re-appointed, retirement would be automatic one year after expiration of the regular term.

A... PAIR OF DALLAS, TEXAS HAMS WHO REFUSED TO BE REEXAMINED AFTER THE FCC RECEIVED COMPLAINTS OF IRREGULARITIES IN THEIR TEST SESSION, HAVE BEEN CLEARED OF ALL SUSPICION BY THE FCC. "It appears that the charges against the pair were an outgrowth of an ongoing repeater 'war' in the Dallas area. "The Commission is now reportedly investigating those who filed the complaints to determine which, if any, laws were broken." (Westlink Report, 01/09/87).

THE OUTCOME OF THE DALLAS REPEATER "WAR" REPORTED ABOVE SHOULD BE SETTLED BY THE FCC HAVING ORDERED THE SECOND (INTERFERING) REPEATER OFF THE AIR AS A RESULT OF THE REPEATER COUNCIL'S BACKING THE ORIGINAL COORDINATED REPEATER. (Westlink Report, 01/09/87).

REVISION OF THE AMATEUR LICENSE APPLICATION FORM 610 IS UNDER WAY TO TAKE CARE OF EXAMINATION CREDIT, ETC. An FCC Public Notice describing the changes is expected soon. Approval of the new 610 by the Office of Management and Budget is necessary. I understand that the substantial backlog of the old version must be depleted before the new 610 may be used.

END-OF-MONTH LICENSE TOTALS		
NOVEMBER	1987	DECEMBER
40,989	EXTRA	41,082
97,821	ADVANCED	97,771
115,998	GENERAL	115,715
85,431	TECHNICIAN	83 312
79,019	NOVICE	79,882
419,258	TOTALS	419,762

(W4GF)

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Prices include shipping in U.S. and Canada, foreign orders welcomed, please write for shipping costs.
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INTERNATIONAL DX CONVENTION - VISALIA, sponsored by NCDXC April 3 - 5, 1987 at Grosvenor Holiday Inn. Prizes, program, meals. Speakers: N6TJ, ZL1AMO, W6KG/W6QL, 3Y1EE (banquet). DX, Contest and Antenna forum, CW and SSB copying contest. Registration (+meals) $45, forums only $15. Contact Jim Hicks, KK6X, (707) 546-5212

SUFFOLK COUNTY INDOOR-OUTDOOR ELECTRONIC FLEA MARKET May 3, 1987, 8-2 p.m. rain or shine at Republic lodge No.1987, 585 Broad Hollow Rd. (Route 110), Melville, NY. Rain or shine, free parking. Contact Bill Sullivan, N2ETG, (516) 689-9871.

SECOND ANNUAL DX HAMVENTION DINNER sponsored by Southwest Ohio DX Assn. at Stoufer's Dayton Plaza Hotel on Friday, April 24, 1987. Program features KH6BZF in "7J1 American Apple Pie... Mystique from the Far East." The MC will again be Jay Slough, K4ZLE. Displays and cash bar at 6:30, dinner at 7:00. Advance reservations are required. Send check for $19.00 each to Jay Slough, 8183 Woodward Dr. West Chester, OH 45069. Plan to visit many hospitality suites afterwards.

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INTERNATIONAL RADIOSPORT ASSN.

PO Box 282, Pine Brook, NJ 07058 Tel. (201) 227-0712

Purpose and objectives:

1. To promote international friendship and goodwill through sportsmanship, radio contesting and DXing.
2. To improve the quality of amateur radio operators and operating through education and experience, by voicing the opinions of radio amateurs that are experienced and have contributed to the hobby.
3. To promote amateur radio contesting and other operating-related activities as a sport, and to provide the publicity and recognition that it deserves in the public media.
4. To publish timely articles in the monthly magazine RADIOSPORTING, to feature technical articles on equipment design and modifications, antenna construction, radio-wave propagation, and commercial equipment reviews by qualified people.
5. To organize, as an annual event, the "International Contest Symposium," to feature timely topics with the participation of some of the world's leading amateurs at the Symposium.
6. To hold an annual Awards Dinner with an entertainment program, where awards for various achievements will be presented.
7. To maintain and publish all time record tables for significant contests.
8. To sponsor and run an annual World Radio Championship Contest and the DX Century Award program, for working a minimum of hundred countries on single bands or six or more bands.
9. To administer the "Contest Hall of Fame" and vote on awarding membership to those who have significantly contributed to the sport of contesting.
10. To coordinate and assist in the scheduling of international contests.
11. To hold regular weekly meetings on air on 20 and 80 m. (14.200, 3.830)
12. To provide an automatic, computer controlled bulletin station that transmits the latest DX and Contest news on CW and RTTY.(14.098)
13. All in all, the IRSA is dedicated to the pursuit of excellence and quality in amateur radio by promoting, publicizing and leading the way.
14. Attractive numbered membership certificates and badges are issued to members.
15. IRSA is run by contesters who are selected for their accomplishments and it is independent of any national or commercial organizations.
16. IRSA will assist and sponsor Contests/DXpeditions, Trophies and other radio sporting and publicity events.
17. IRSA is a non profit organization, with all proceeds to be used to finance events and awards sponsored by IRSA and to cover expenses incurred by Association.
18. IRSA members can display the IRSA logo on their QSL cards and correspondence; members agree to obey the Contester's Code of Ethics and to promote it.

The initial fee to join the IRSA is US $9; it includes the cost of a certificate and a badge ($4 without the badge). The yearly membership dues are US $4. (Or 22 and 10 IRCs resp.)

Honorary Life Membership will be awarded to those who significantly contribute to IRSA and the sport of contesting.

Members are entitled to be elected and to elect officers of IRSA. They will also enjoy many services and privileges offered exclusively to members.

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